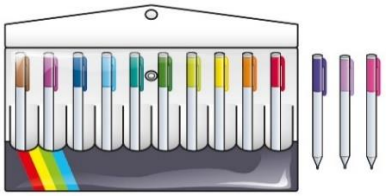
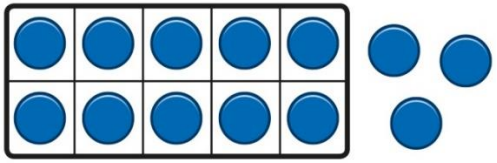
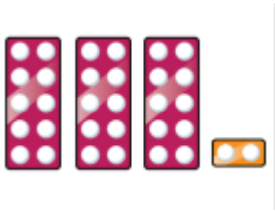
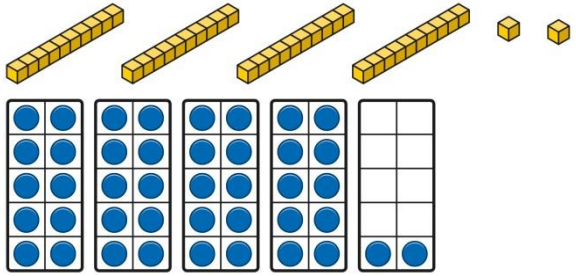
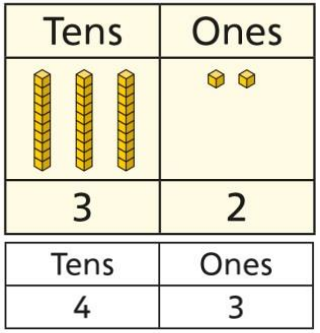
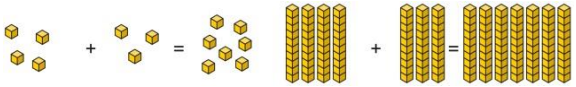
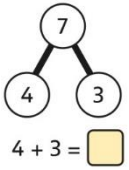
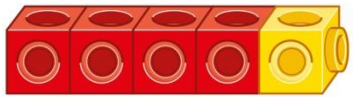
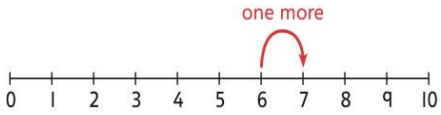
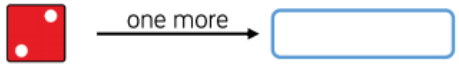
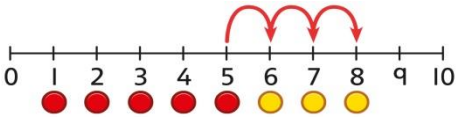
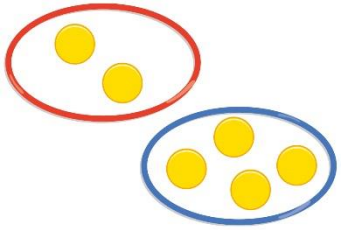
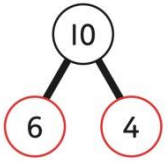
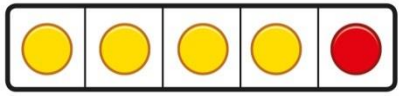
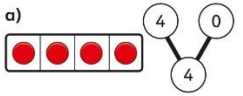
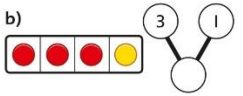
Harbertonford C of E Primary: Calculation policy: Years 1-6

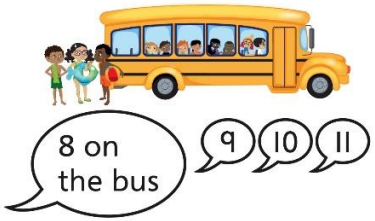
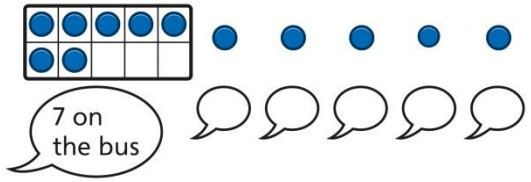
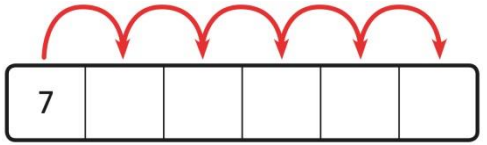
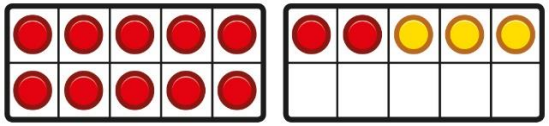
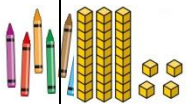
This calculation policy is a guide for teaching the progression of calculation strategies throughout primary education at Harbertonford but does not consider any strategy to be specific for use only in particular year groups. Depth of mathematical learning at Harbertonford is achieved through undertaking and representing mathematics in concrete, pictorial and abstract forms.

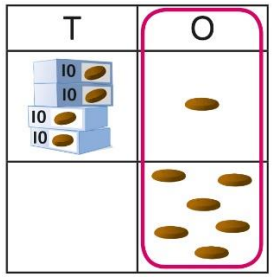
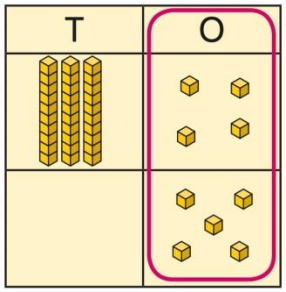
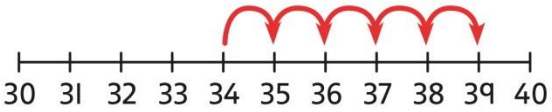
Years 1&2

	Concrete	Pictorial	Abstract
Place value	**By Y2 children will be taught:**		
Understanding 10s and 1s **<u>Vocabulary</u>:** **Ones** **Tens** **Count on** **Count back** **Groups** **Equals**	**Understanding teen numbers as a complete 10 and some more** Complete a group of 10 objects and count more.  *13 is 10 and 3 more.*	**Understanding teen numbers as a complete 10 and some more** Use a ten frame to support understanding of a complete 10 for teen numbers.  *13 is 10 and 3 more.*	**Understanding teen numbers as a complete 10 and some more**. *1 ten and 3 ones equal 13.* *10 + 3 = 13*

Understanding 10s and 1s **<u>Vocabulary</u>:** **Groups** **Altogether** **Place value** **More** **Digit**	Group objects into 10s and 1s.  Bead strings to understand 	Understand 10s and 1s equipment, and link with visual representations on ten frames. 	Represent numbers on a place value grid, using equipment or numerals. 
Adding & subtracting 1s, 2s, 3, 5s, & 10s **<u>Vocabulary</u>:** **Count on** **More** **Number bonds** **Altogether** **Sum** **Total**	Use known bonds and unitising to add 10s.  *I know that 4 + 3 = 7.* *So, I know that 4 tens add 3 tens is 7 tens.*	Use known bonds and unitising to add 10s.  *I know that 4 + 3 = 7.* *So, I know that 4 tens add 3 tens is 7 tens.*	Use known bonds and unitising to add 10s.  *4 + 3 = 7* *4 tens + 3 tens = 7 tens* *40 + 30 = 70*
Addition & Subtraction	**All children will be taught:**		
	Concrete	**Pictorial**	**Abstract**
Counting and adding more **<u>Vocabulary</u>:** **Count on**	Children add one more person or object to a group to find one more. Language: the number after, one more than Use of number line and dice	Children add one more cube or counter to a group to represent one more. Numicon supports this area. 	Use a number line to understand how to link counting on with finding one more. 

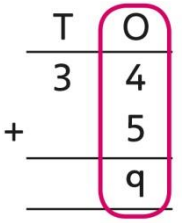
More **Number bonds** **Altogether** **Sum** **Total** **Equals**		*One more than 4 is 5.*	*One more than 6 is 7.* *7 is one more than 6.* Learn to link counting on with adding more than one.  *5 + 3 = 8*
Understanding part-part-whole relationship **<u>Vocabulary</u>:** **Groups** **Altogether** **Total** **Add**	Sort people and objects into parts and understand the relationship with the whole.  *The parts are 2 and 4. The whole is 6.*	Children draw to represent the parts and understand the relationship with the whole.  *The parts are 1 and 5. The whole is 6.*	Use a part-whole model to represent the numbers.   6 + 4 = 10
Knowing and finding number bonds within 20 **<u>Vocabulary</u>:** **Count on** **More** **Number bonds** **Altogether** **Sum** **Total**	Break apart a group and put back together to find and form number bonds. 7+3 = 10  **7+3**	Use five and ten frames to represent key number bonds.  *5 = 4 + 1*	Use a part-whole model alongside other representations to find number bonds. Make sure to include examples where one of the parts is zero.   *4 + 0 = 4* *3 + 1 = 4*

Adding by counting on **<u>Vocabulary</u>:** **Count on** **More** **Altogether** **Add** **Sum** **Total** **Ones** **Greater**	Children use knowledge of counting to 20 to find a total by counting on using people or objects. 	Children use counters to support and represent their counting on strategy. 	Children use number lines or number tracks to support their counting on strategy.  7 + 5 = ☐
Adding the 1s **<u>Vocabulary</u>:** **Count on** **More** **Altogether** **Add** **Sum** **Total** **Ones**	Children use bead strings to recognise how to add the 1s to find the total efficiently.  *2 + 3 = 5* *12 + 3 = 15*	calculations using ten frames to add a teen and 1s.  *2 + 3 = 5* *12 + 3 = 15*	Children recognise that a teen is made from a 10 and some 1s and use their knowledge of addition within 10 to work efficiently. *3 + 5 = 8* *So, 13 + 5 = 18*
Adding a 1-digit number to a 2-digit number not bridging a 10 **<u>Vocabulary</u>:**	Add the 1s to find the total. Use known bonds within 10.   *41 is 4 tens and 1 one.* *41 add 6 ones is 4 tens and 7 ones.*	Add the 1s. *34 is 3 tens and 4 ones.* *4 ones and 5 ones are 9 ones.* *The total is 3 tens and 9 ones.*	Add the 1s. Understand the link between counting on and using known number facts. Children should be encouraged to use known number bonds to improve efficiency and accuracy.

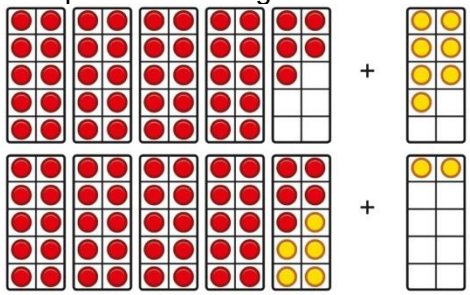
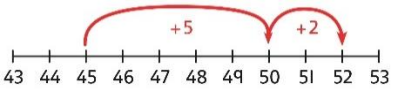
<table>
<tr>
<td>Count on
More
Number bonds
Altogether
Sum
Total
Place value
Ones
Tens</td>
<td>This can also be done in a place value grid.
 
</td>
<td> 
</td>
<td> 

This can be represented horizontally or vertically.

34 + 5 = 39

or
 
</td>
</tr>
<tr>
<td>Adding a 1-digit number to a 2-digit number bridging 10

<u>Vocabulary</u>:

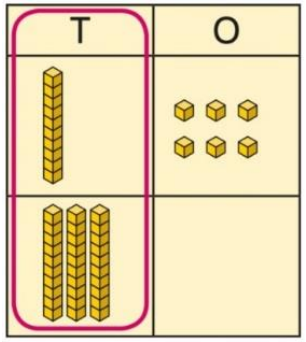
Count on
More
Number bonds
Altogether
Sum
Total
Place value
Ones
Tens</td>
<td colspan="2">Complete a 10 using number bonds.
  </td>
<td>Complete a 10 using number bonds.
 

7 = 5 + 2
45 + 5 + 2 = 52</td>
</tr>
</table>

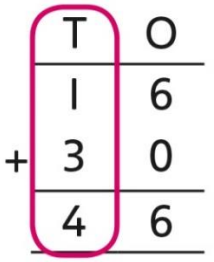
<table>
<tr>
<td>Adding a multiple of 10 to a 2-digit number using columns

<u>Vocabulary</u>:

Count on
More
Altogether
Sum
Total
Place value
Ones
Tens</td>
<td colspan="2">Add the 10s using base 10 and a place value grid to support.

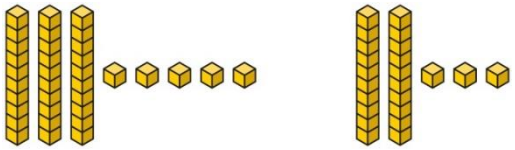
16 is 1 ten and 6 ones.
30 is 3 tens.
There are 4 tens and 6 ones in total.</td>
<td>Add the 10s represented vertically. Children must understand how the method relates to unitising of 10s and place value.

1 + 3 = 4
1 ten + 3 tens = 4 tens
16 + 30 = 46</td>
</tr>
<tr>
<td>Adding two 2-digit numbers

<u>Vocabulary</u>:

Place value
Ones
Tens
More
Altogether
Sum
Total</td>
<td>Add the 10s and 1s separately.

5 + 3 = 8
There are 8 ones in total.

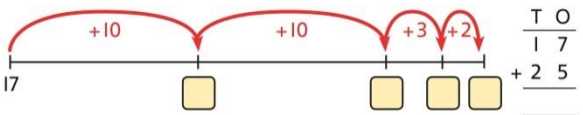
3 + 2 = 5 (3 tens + 2 tens)
There are 5 tens in total.

35 + 23 = 58</td>
<td>Add the 10s and 1s separately. Use a part-whole model to support.

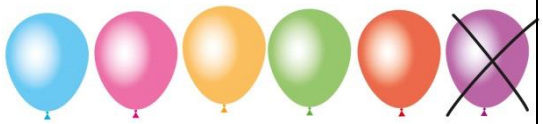
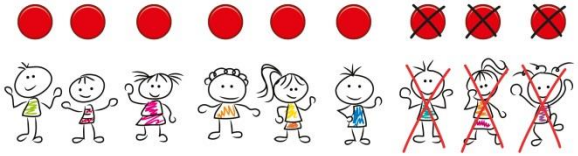
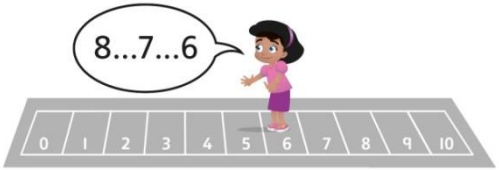
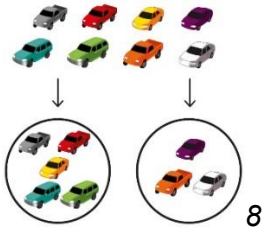
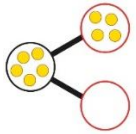
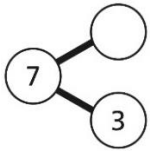
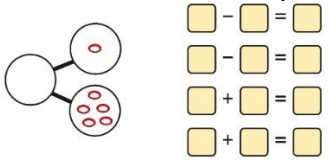
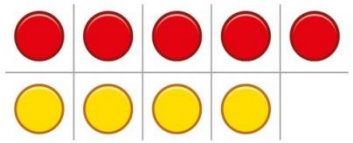
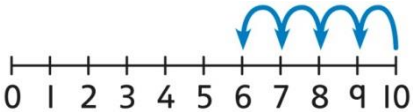
Use place value achart and base 10 to support

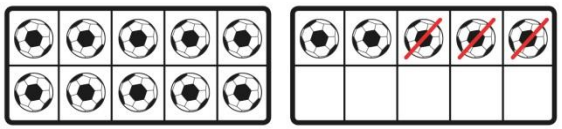
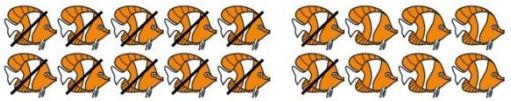
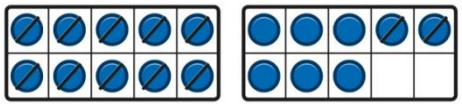
11 = 10 + 1
32 + 10 = 42
42 + 1 = 43

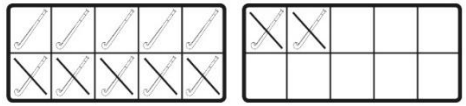
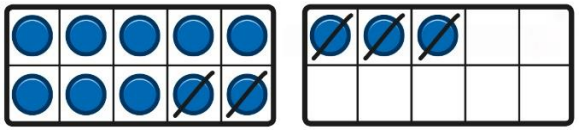
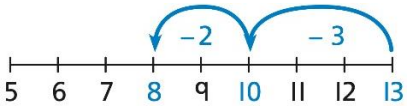
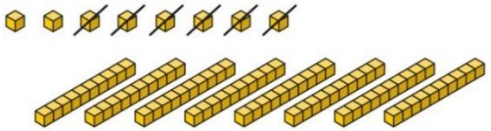
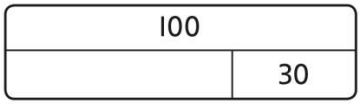
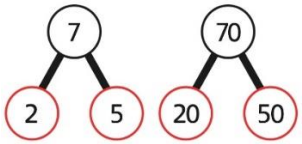
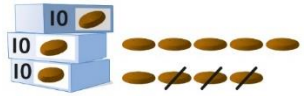
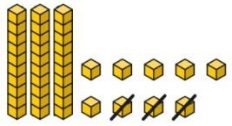
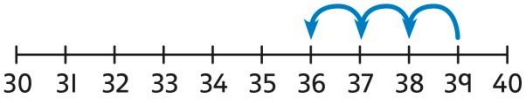
32 + 11 = 43</td>
<td>Add the 10s and the 1s separately, bridging 10s where required. A number line can support the calculations.

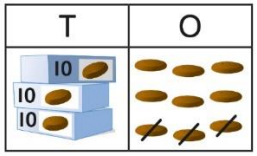
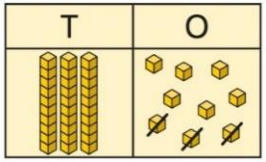
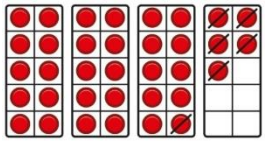
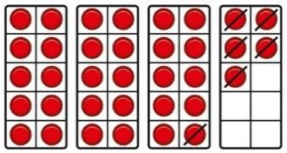
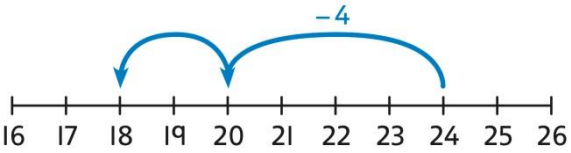
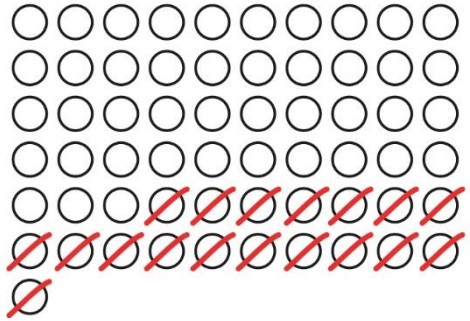
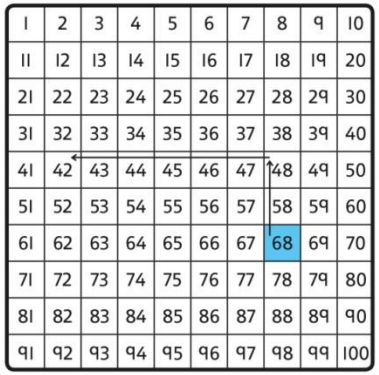
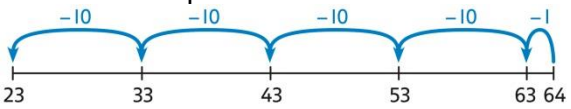
 

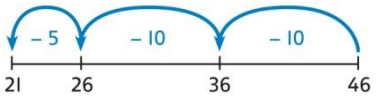
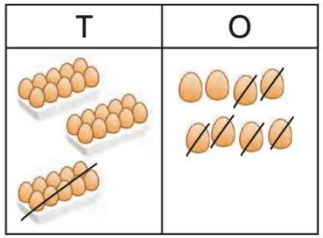
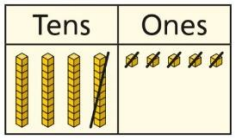
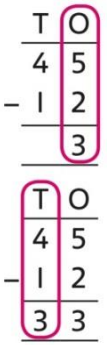
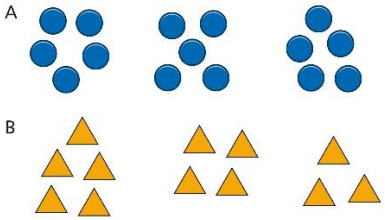
17 + 25</td>
</tr>
<tr>
<td rowspan="2">Subtraction</td>
<td colspan="3">All children will be taught:</td>
</tr>
<tr>
<td>Concrete</td>
<td>Pictorial</td>
<td>Abstract</td>
</tr>
</table>

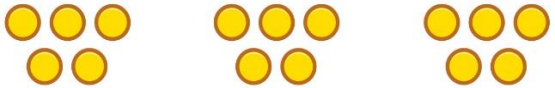
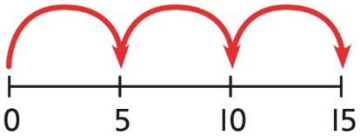
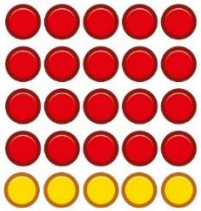
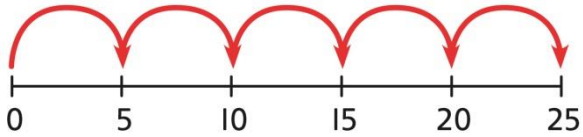
Counting back and taking away **<u>Vocabulary</u>:** **Less** **Take** **Remove** **Less than** **Fewer** **Count back**	Children arrange objects and remove to find how many are left.  *1 less than 6 is 5.* *6 subtract 1 is 5.*	Children draw and cross out or use counters to represent objects from a problem.  9 – ☐ = ☐ There are ☐ children left.	Children count back to take away and use a number line or number track to support the method.  *9 − 3 = 6*
Finding a missing part, given a whole and a part **<u>Vocabulary</u>:** **Total** **Less** **Take away** **Fewer** **Part-part-whole**	Children separate a whole into parts and understand how one part can be found by subtraction.  *8 − 5 = ?*	Children represent a whole and a part and understand how to find the missing part by subtraction.  5 – 4 = ☐	Children use a part-whole model to support the subtraction to find a missing part.  *7 − 3 = ?* Children develop an understanding of the relationship between addition and subtraction facts in a part-whole model.  If I know this what else do I know?
Finding the difference **<u>Vocabulary</u>:** **Subtract**	Arrange two groups so that the difference between the groups can be worked out.	Represent objects using sketches or counters to support finding the difference. 	Children understand ‘find the difference’ as subtraction. 

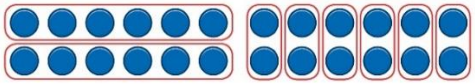
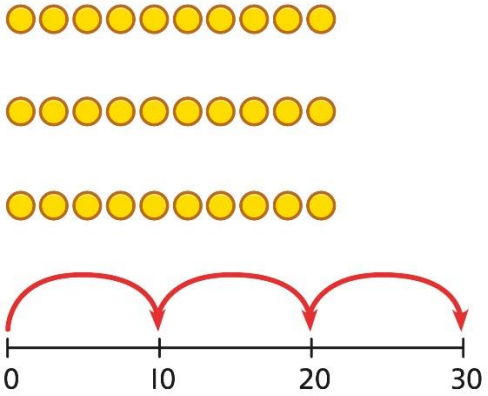
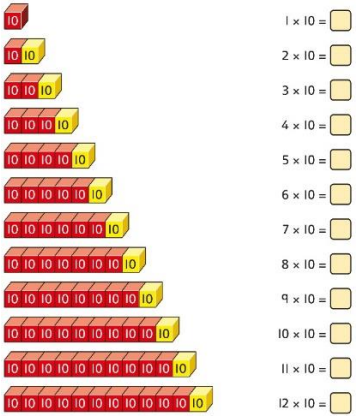
Fewer **Less** **Gone** **Count back**	 *8 is 2 more than 6.* *6 is 2 less than 8.* *The difference between 8 and 6 is 2.*	*5 − 4 = 1* *The difference between 5 and 4 is 1.*	*10 − 4 = 6* *The difference between 10 and 6 is 4.*
Subtraction within 20 **<u>Vocabulary</u>:** **Subtract** **Fewer** **Less** **Count back** **Difference** **Take away**	Understand when and how to subtract 1s efficiently. Use a bead string to subtract 1s efficiently.  *5 − 3 = 2* *15 − 3 = 12*	Understand when and how to subtract 1s efficiently.  *5 − 3 = 2* *15 − 3 = 12*	Understand how to use knowledge of bonds within 10 to subtract efficiently. *5 − 3 = 2* *15 − 3 = 12*
Subtracting 10s and 1s **<u>Vocabulary</u>:** **Subtract** **Fewer** **Less** **Count back** **Difference** **Take away** **Place value**	For example: 18 − 12 Subtract 12 by first subtracting the 10, then the remaining 2.  *First subtract the 10, then take away 2.*	For example: 18 − 12 Use ten frames to represent the efficient method of subtracting 12.  *First subtract the 10, then subtract 2.*	Use a part-whole model to support the calculation. *19 − 14* *19 − 10 = 9* *9 − 4 = 5* *So, 19 − 14 = 5*
Subtraction	For example: 12 − 7	Represent the use of bonds using ten frames.	Use a number line and a part-whole model

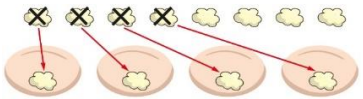
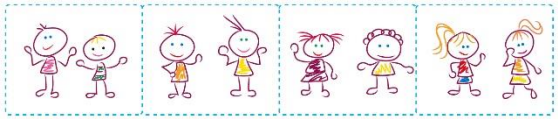
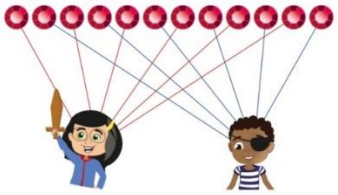
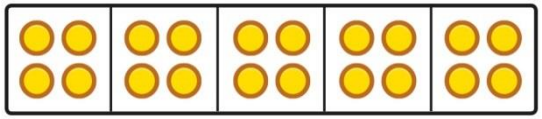
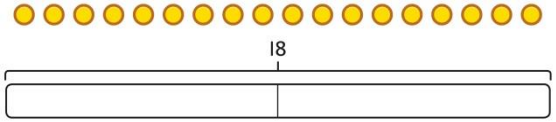
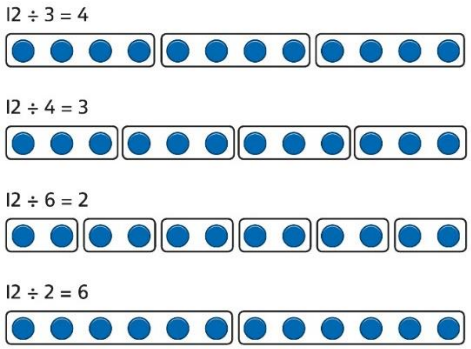
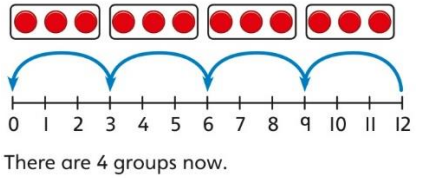
bridging 10 using number bonds **<u>Vocabulary</u>:** **Subtract** **Fewer** **Less** **Count back** **Difference** **Take away** **Place value** **Number bonds**	Arrange objects into a 10 and some 1s, then decide on how to split the 7 into parts.  *7 is 2 and 5, so I take away the 2 and then the 5.*	 *For 13 – 5, I take away 3 to make 10, then take away 2 to make 8.*	to support the method. *13 − 5* 
Subtracting multiples of 10 **<u>Vocabulary</u>:** **Difference** **Take away** **Place value**	Use known number bonds and unitising to subtract multiples of 10.  *8 subtract 6 is 2.* *So, 8 tens subtract 6 tens is 2 tens.*	Use known number bonds and unitising to subtract multiples of 10.  *10 − 3 = 7* *So, 10 tens subtract 3 tens is 7 tens.*	Use known number bonds and unitising to subtract multiples of 10.  If I know that 7-5=2 then I know that 70-50=20
Subtracting a single-digit number **<u>Vocabulary</u>:** **Subtract** **Fewer** **Less** **Count back**	Subtract the 1s. This may be done in or out of a place value grid. 	Subtract the 1s. This may be done in or out of a place value grid. 	Subtract the 1s. Understand the link between counting back and subtracting the 1s using known bonds. 

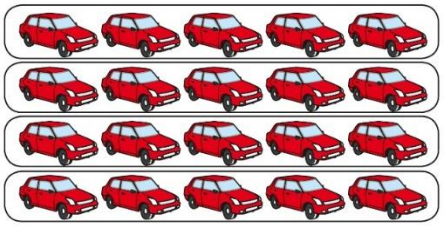
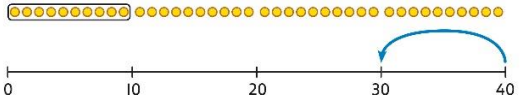
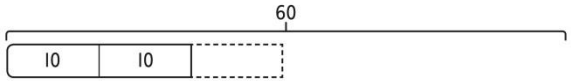
Difference **Take away** **Place value**	 **39-3= 36**	 	T O 3 9 − 3 3 6 *9 − 3 = 6* *39 − 3 = 36*
Subtracting a single-digit number bridging 10 **<u>Vocabulary</u>:** **Subtract** **Fewer** **Less** **Count back** **Difference** **Take away** **Place value** **Number bonds**	Bridge 10 by using known bonds.  *35 − 6* *I took away 5 counters, then 1 more.*	Bridge 10 by using known bonds.  *35 − 6* *First, I will subtract 5, then 1.*	Bridge 10 by using known bonds.  *24 − 6 = ?* *24 − 4 − 2 = ?*
Subtracting a 2-digit number **<u>Vocabulary</u>:** **Subtract** **Fewer** **Less** **Count back** **Difference** **Take away** **Place value**	Subtract by taking away.  *61 − 18* *I took away 1 ten and 8 ones.*	Subtract the 10s and the 1s. This can be represented on a 100 square.  	Subtract the 10s and the 1s. This can be represented on a number line.  *64 − 41 = ?* *64 − 1 = 63* *63 − 40 = 23* *64 − 41 = 23*

		68-26  *46 − 20 = 26* *26 − 5 = 21* *46 − 25 = 21*	
Subtracting a 2-digit number using place value and columns **<u>Vocabulary</u>:** **Subtract** **Fewer** **Less** **Count back** **Difference** **Take away** **Place value**	Subtract the 1s. Then subtract the 10s. This may be done in or out of a place value grid.  *38 − 16 = 22*	Subtract the 1s. Then subtract the 10s.  	Using column subtraction, subtract the 1s. Then subtract the 10s. 
Multiplication	All children will be taught		
	Concrete	**Pictorial**	**Abstract**
Recognising and making equal groups **<u>Vocabulary</u>:** **Groups** **Same** **Equal**	Children arrange objects in equal and unequal groups and understand how to recognise whether they are equal.  	Children draw and represent equal and unequal groups.  	*Three equal groups of 4*. *Four equal groups of 3*.

Represent			
Equal groups and repeated addition **Finding the total of equal groups by counting in 2s, 5s and 10s** **<u>Vocabulary</u>:** **Groups** **Same** **Equal** **Represent** **Counting on** **Place value** **Repeated addition**	Recognise equal groups and write as repeated addition and as multiplication.  *3 groups of 5 chairs* *15 chairs altogether*	Recognise equal groups using standard objects such as counters and write as repeated addition and multiplication.  *3 groups of 5* *15 in total* Counting in 2s, 5s and 10s	Use a number line and write as repeated addition and as multiplication.  *5 + 5 + 5 = 15* *3 × 5 = 15*
Using arrays to represent multiplication and support understanding **<u>Vocabulary</u>:** **Groups** **Same** **Equal** **Counting on**	Understand the relationship between arrays, multiplication and repeated addition.  *4 groups of 5*	Understand the relationship between arrays, multiplication and repeated addition.  *4 groups of 5 … 5 groups of 5*	Understand the relationship between arrays, multiplication and repeated addition.  *5 × 5 = 25*

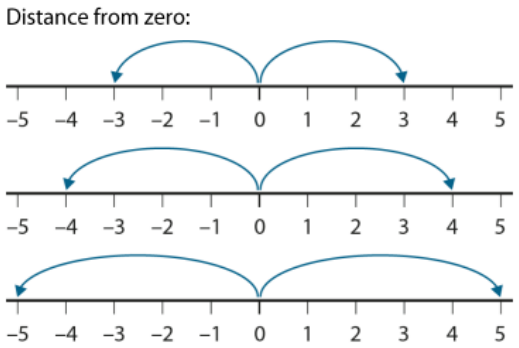
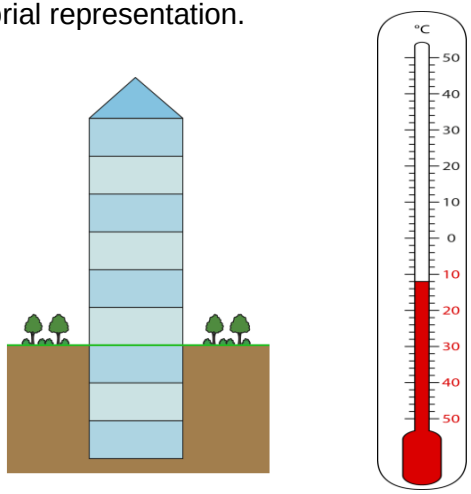
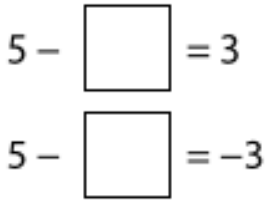
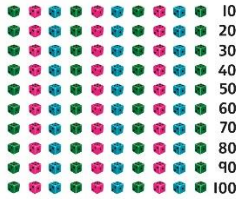
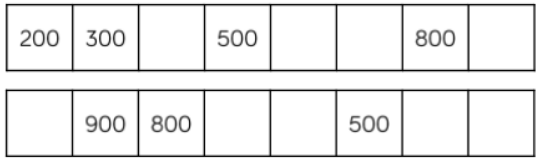
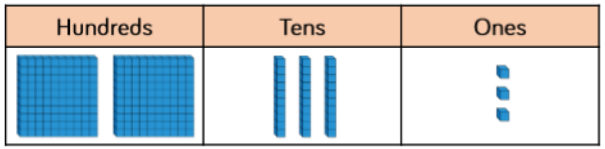
Repeated addition			
Understanding commutativity **<u>Vocabulary</u>:** **Pattern** **Groups** **Same** **Equal**	Use arrays to visualise commutativity.  *I can see 6 groups of 3.* *I can see 3 groups of 6.*	Form arrays using counters to visualise commutativity. Rotate the array to show that orientation does not change the multiplication.  *This is 2 groups of 6 and also 6 groups of 2.*	Use arrays to visualise commutativity.  *4 + 4 + 4 + 4 + 4 = 20* *5 + 5 + 5 + 5 = 20* *4 × 5 = 20 and 5 × 4 = 20*
Learning ×2, ×5 and ×10 table facts **<u>Vocabulary</u>:** **Times tables** **Pattern** **Groups** **Same** **Equal** **Counting on** **Repeated addition**	Develop an understanding of how to unitise groups of 2, 5 and 10 and learn corresponding times-table facts.  *3 groups of 10 … 10, 20, 30* *3 × 10 = 30*	Understand how to relate counting in unitised groups and repeated addition with knowing key times-table facts.  *10 + 10 + 10 = 30* *3 × 10 = 30*	Understand how the times-tables increase and contain patterns.  *5 × 10 = 50* *6 × 10 = 60*
Division	All children will be taught		

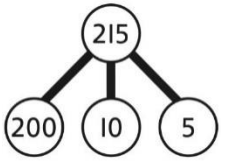
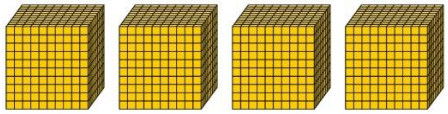
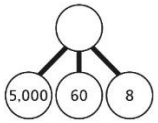
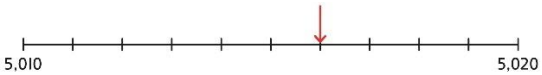
	Concrete	Concrete	Concrete
Sharing **<u>Vocabulary</u>:** **Share** **Groups**	Share a set of objects into equal parts and work out how many are in each part**.** 	Sketch or draw to represent sharing into equal parts/groups. 	*10 shared into 2 equal groups gives 5 in each group.*
Sharing & Grouping equally **<u>Vocabulary</u>:** **Same** **Equal** **Share** **Groups**	Start with a whole and share into equal parts, one at a time.  *12 shared equally between 2.* *They get 6 each.*	Represent the objects shared into equal parts using a bar model.  *20 shared into 5 equal parts.* *There are 4 in each part.*	Use a bar model to support understanding of the division.  *18 ÷ 2 = 9*
	Understand how to make equal groups from a whole.  *8 divided into 4 equal groups.* *There are 2 in each group.*	Understand the relationship between grouping and the division statements. 	Understand how to relate division by grouping to repeated subtraction.  *12 divided into groups of 3.* *12 ÷ 3 = 4* *There are 4 groups.*

Using known times-tables to solve divisions **<u>Vocabulary</u>:** **Times tables** **Pattern** **Groups** **Counting back** **Repeated subtraction** **Number line** **Bar model**	Understand the relationship between multiplication facts and division.  *4 groups of 5 cars is 20 cars in total.* *20 divided by 4 is 5.*	Link equal grouping with repeated subtraction and known times-table facts to support division.  *40 divided by 4 is 10.* Use a bar model to support understanding of the link between times-table knowledge and division. 	Relate times-table knowledge directly to division. 1 × 10 = 10 2 × 10 = 20 **3 × 10 = 30** 4 × 10 = 40 5 × 10 = 50 6 × 10 = 60 7 × 10 = 70 8 × 10 = 80 I used the 10 times-table to help me. 3 × 10 = 30. *I know that 3 groups of 10 makes 30, so I know that 30 divided by 10 is 3.* *3 × 10 = 30 so 30 ÷ 10 = 3*

Years 3 & 4

	Concrete	Pictorial	Abstract
Place value	**All children will be taught:**		

Count forwards and backwards through zero to include negative numbers. **<u>Vocabulary</u>:** **Zero** **Negative** **Difference**	Count forward & backward through zero using a number line. 	Count forward & backward through zero within pictorial representation. 	Recognise difference between numbers below/above zero. 
Understanding 100s **<u>Vocabulary</u>:** **Place value** **Ones** **Tens** **Hundreds** **Equal** **Groups** **Pattern** **Represent**	Understand the cardinality of 100, and the link with 10 tens. Use cubes to place into groups of 10 tens. 	count in steps of 100. 	Represent steps of 100 on a number line and a number track and count up to 1,000 and back to 0. 
Understanding place value to 1,000 **<u>Vocabulary</u>:**	Unitise 100s, 10s and 1s to build 3-digit numbers. 	Use equipment to represent numbers to 1,000. 	Represent the parts of numbers to 1,000 using a part-whole model.

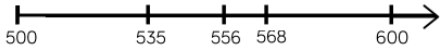
Place value **Ones** **Tens** **Hundreds** **Thousands** **Equal** **Groups** **Pattern** **Represent**			 *215 = 200 + 10 + 5* Recognise numbers to 1,000 represented on a number line, including those between intervals.
Understanding numbers to 10,000 **<u>Vocabulary</u>:** **Place value** **Ones** **Tens** **Hundreds** **Thousands** **Equal** **Groups** **Pattern** **Represent**	Use place value equipment to understand the place value of 4-digit numbers.  *4 thousands equal 4,000.*	Represent numbers using place value counters once children understand the relationship between 1,000s and 100s.  4,000 + 300+ 50 + 5 = 4,355	Understand partitioning of 4-digit numbers, including numbers with digits of 0.  *5,000 + 60 + 8 = 5,068* Understand and read 4-digit numbers on a number line. 

Round to the nearest 10/100/1000

<u>Vocabulary</u>:

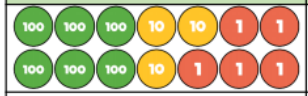
Place value
To the nearest
Round up
Round down

Say whether each number on the number line is closer to 500 or 600.



Round 535, 556 and 568 to the nearest 100
Use the stem sentence: ____ rounded to the nearest 100 is ____.

Complete the table:

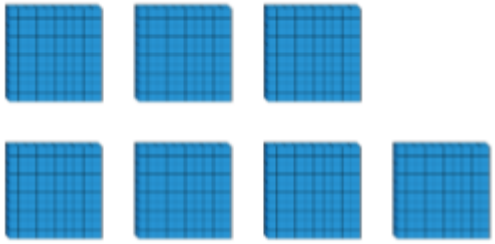
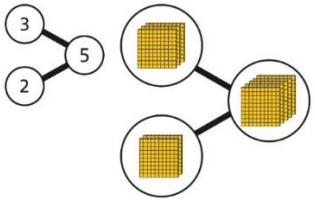
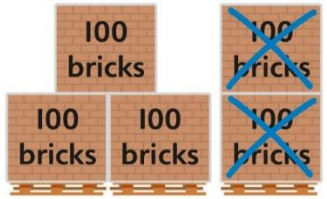
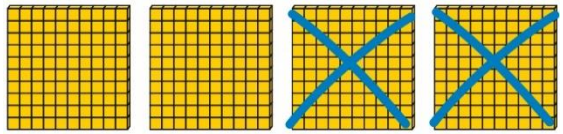
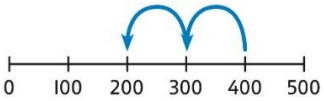
Start number	Rounded to the nearest 10
	
851	
XCVIII	

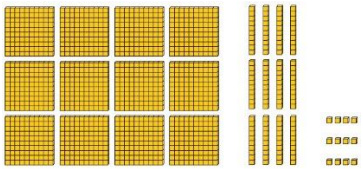
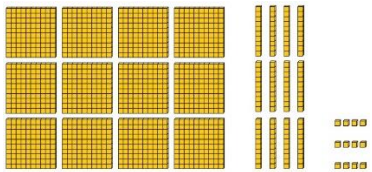
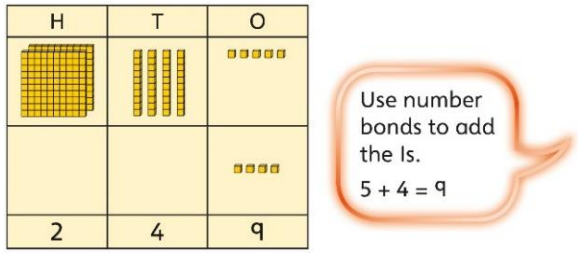
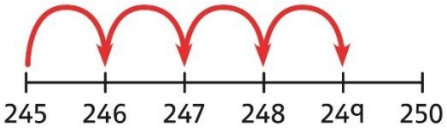
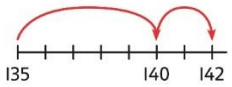
Round these numbers to the nearest 1,000

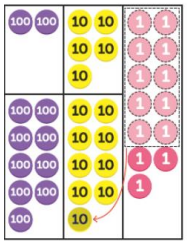
- Eight thousand and fifty-six
- 5 thousands, 5 hundreds, 5 tens and 5 ones
- 
- LXXXII

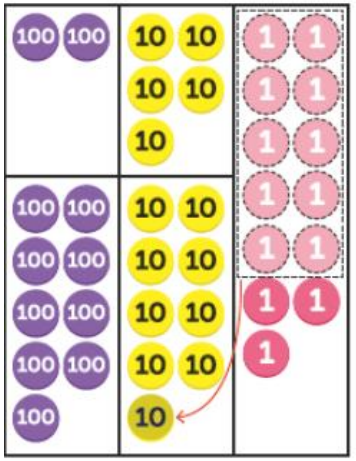
Complete the table.

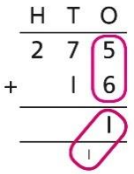
Start number	Rounded to the nearest 10	Rounded to the nearest 100	Rounded to the nearest 1,000
			
4,999			
LXXXII			

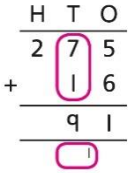
Adding 100s **<u>Vocabulary</u>:** **Place value** **Pattern** **Groups** **Counting on** **Addition**	Use known facts and unitising to add multiples of 100.  *3 + 2 = 5* *3 hundreds + 2 hundreds = 5 hundreds* *300 + 200 = 500*	Use known facts and unitising to add multiples of 100.  *3 + 4 = 7* *3 hundreds + 4 hundreds = 7 hundreds* *300 + 400 = 700*	Use known facts and unitising to add multiples of 100. Represent the addition on a number line. Use a part-whole model to support unitising.  *3 + 2 = 5* *300 + 200 = 500*
Subtracting 100s **<u>Vocabulary</u>:** **Place value** **Pattern** **Groups** **Counting on** **Subtraction**	Use known facts and unitising to subtract multiples of 100.  *5 − 2 = 3* *500 − 200 = 300*	Use known facts and unitising to subtract multiples of 100.  *4 − 2 = 2* *400 − 200 = 200*	Understand the link with counting back in 100s.  *400 − 200 = 200* Use known facts and unitising as efficient and accurate methods. I know that 7 − 4 = 3. Therefore, I know that 700 − 400 = 300.
Multiplying by multiples of 10 and 100 **<u>Vocabulary</u>:**	Use unitising and place value equipment to understand how to multiply by multiples of 1, 10 and 100.	Use unitising and place value equipment to understand how to multiply by multiples of 1, 10 and 100.	Use known facts and understanding of place value and commutativity to multiply mentally. *4 × 7 = 28* *4 × 70 = 280*

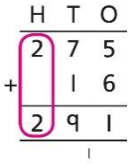
Groups of **Counting on** **Pattern** **Multiples** **Product** **Lots of**	 *3 groups of 4 ones is 12 ones.* *3 groups of 4 tens is 12 tens.* *3 groups of 4 hundreds is 12 hundreds.*	 *3 × 4 = 12* *3 × 40 = 120* *3 × 400 = 1,200*	*40 × 7 = 280* *4 × 700 = 2,800* *400 × 7 = 2,800*
Addition & Subtraction	**All children will be taught the column method. Place value equipment will be used to represent additions and support mathematics where necessary. Other methods may also offer support to secure knowledge and skills.** **All children will be taught to add1/10/100 without exchange and then add 1/10/100 with exchange**		
	Concrete	**Pictorial**	**Abstract**
3 / 4-digit number + 1s, no exchange or bridging **<u>Vocabulary</u>:** **Addition** **Place value** **Sum** **Total** **Altogether** **Increase** **Counting on** **Greater**	Use number bonds to add the 1s.  *214 + 4 = ?* *Now there are 4 + 4 ones in total.* *4 + 4 = 8* *214 + 4 = 218*	Use number bonds to add the 1s.  *245 + 4* *5 + 4 = 9* *245 + 4 = 249*	Understand the link with counting on. *245 + 4*  Use number bonds to add the 1s and understand that this is more efficient and less prone to error. *245 + 4 = ?* *I will add the 1s.* *5 + 4 = 9* *So, 245 + 4 = 249*
3 / 4-digit number + 1s with exchange **<u>Vocabulary</u>:**	Understand that when the 1s sum to 10 or more, this requires an exchange of 10 ones for 1 ten. Children should explore this using unitised objects or physical apparatus.	Exchange 10 ones for 1 ten where needed. Use a place value grid to support the understanding.	Understand how to bridge by partitioning to the 1s to make the next 10. 

Addition **Exchange** **Place value** **Sum** **Total** **Altogether** **Increase** **Counting on** **Greater**			*135 + 7 = ?* *135 + 5 + 2 = 142* Ensure that children understand how to add 1s bridging a 100. *198 + 5 = ?* *198 + 2 + 3 = 203*
3-digit number + 10s, no exchange **<u>Vocabulary</u>:** **Addition** **Place value** **Sum** **Total** **Altogether** **Increase** **Counting on** **Greater**	Calculate mentally by forming the number bond for the 10s. Add 9 to 3041. 3041 + 9 = ☐ make 10 3041 + 9 = 3040 + 10 3041 + 9 = 3050	Calculate mentally by forming the number bond for the 10s. 98 + 4142 = ☐ make 100 98 + 4142 = 100 + 4140 = 4240	Calculate mentally by forming the number bond for the 10s. *753 + 40* *I know that 5 + 4 = 9* *So, 50 + 40 = 90* *753 + 40 = 793*
3-digit number + 2-digit / 3 digit number, exchange required **<u>Vocabulary</u>:** **Addition** **Place value**	Use place value equipment / grids to model addition and understand where exchange is required.		Use a column method with exchange. Children must understand how the method relates to place value at each stage of the calculation.

<table>
<tr>
<td>Sum
Total
Altogether
Increase
Counting on
Greater
Exchange
Represent</td>
<td colspan="2"> 

There are 13 ones, so that is 1 ten and 3 ones. There are 14 tens so I will exchange.</td>
<td> 

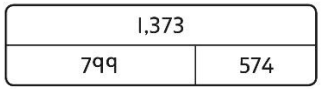


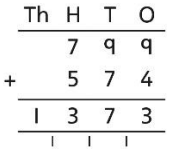


275 + 16 = 291</td>
</tr>
<tr>
<td>Representing additions and checking strategies

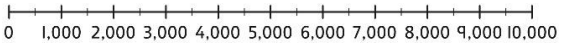
<u>Vocabulary</u>:

Check
Prove
Part-part-whole
Bar models</td>
<td></td>
<td>Bar models may be used to represent additions in problem contexts, and to justify mental methods where appropriate.

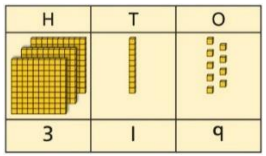
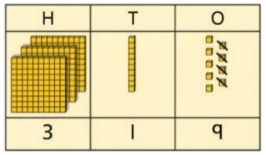
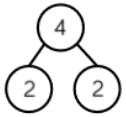
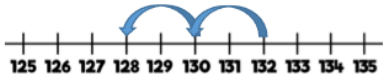
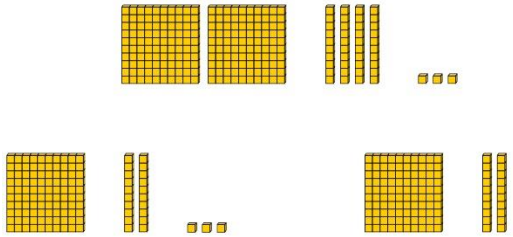
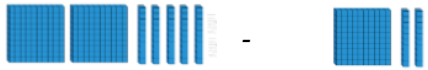


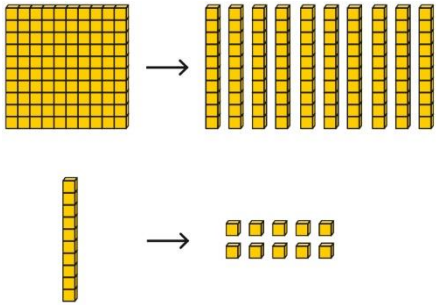
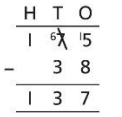
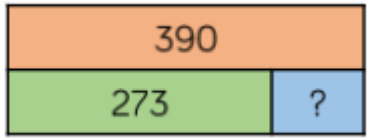
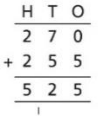
I chose to work out 574 + 800, then subtract 1.</td>
<td>Use rounding and estimating on a number line to check the reasonableness of an addition.

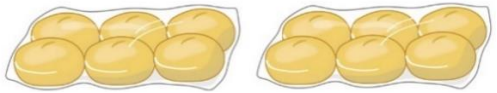
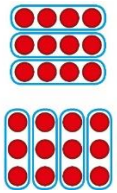
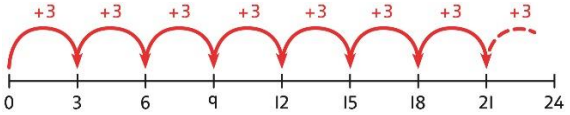
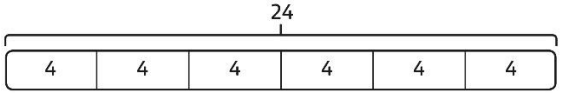
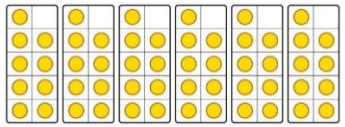
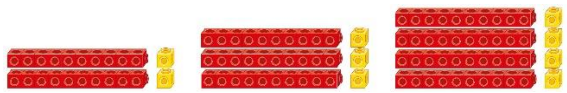
 

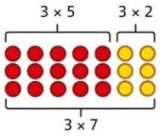
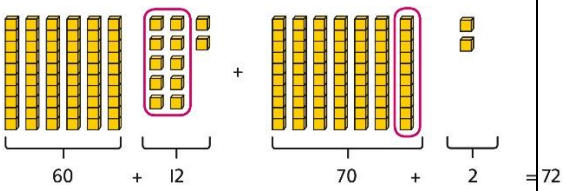
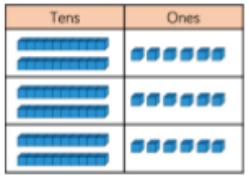
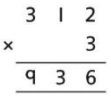
912 + 6,149 = ?

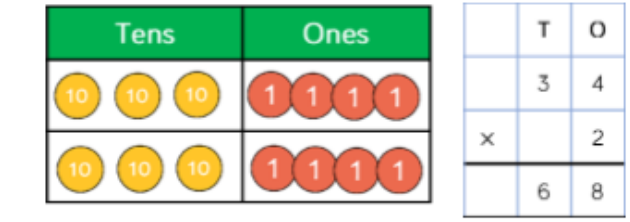
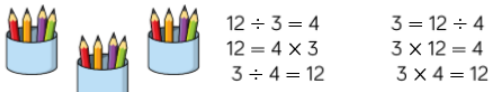
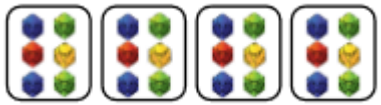
I used rounding to work out that the answer should be approximately 1,000 + 6,000 = 7,000.</td>
</tr>
<tr>
<td>Subtraction</td>
<td colspan="3">All children will be taught column subtraction. Place value equipment will be used to represent subtractions and support mathematics where necessary. Other methods may also offer support to secure knowledge and skills.
All children will be taught to subtract without exchange and then subtract with exchange</td>
</tr>
</table>

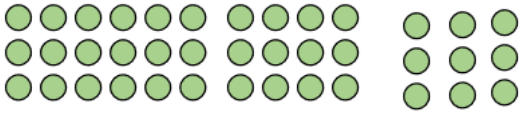
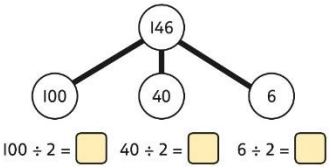
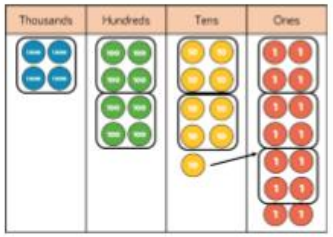
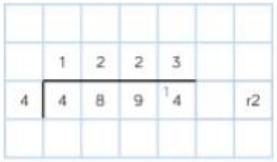
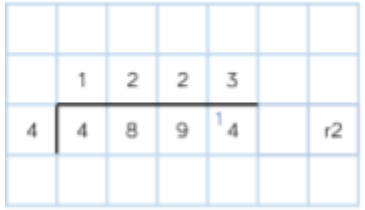
	Concrete	Pictorial	Abstract
3-digit number − 1s, no exchange **<u>Vocabulary</u>:** **Count back** **Fewer** **Minus** **Decrease** **Take (away)** **Less** **Subtract** **Subtraction**	Use number bonds to subtract the 1s.  *214 − 3 = ?*  *4 − 3 = 1* *214 − 3 = 211*	Use number bonds to subtract the 1s.  *319 − 4 = ?*  *9 − 4 = 5* *319 − 4 = 315*	Understand the link with counting back using a number line. 132-4  
3-digit number − up to 3 / 4-digit number **<u>Vocabulary</u>:** **Count back** **Fewer** **Minus** **Decrease** **Take (away)** **Less** **Subtract** **Subtraction** **Exchange**	Use place value equipment to explore the effect of splitting a whole into two parts, and understand the link with taking away. 	Represent the calculation on a place value grid.  	Use column subtraction to calculate accurately and efficiently. H T O 9 9 9 − 3 5 2 7 H T O 9 9 9 − 3 5 2 4 7 H T O 9 9 9 − 3 5 2 6 4 7
3-digit number − up to 3-digit	Use equipment to exchange 1 hundred for 10 tens, and 1 ten for 10 ones.	*Model the required exchange on a place value grid.*	Use column subtraction to work accurately and efficiently.

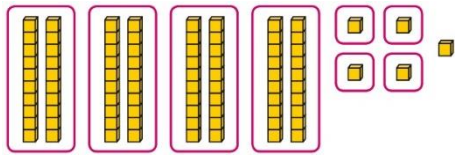
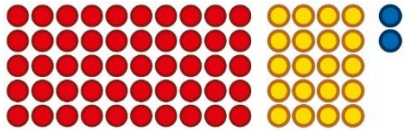
number, exchange required **<u>Vocabulary</u>:** **Count back** **Fewer** **Minus** **Decrease** **Take (away)** **Less** **Subtract** **Subtraction** **Exchange**		*175 − 38 = ?* *I need to subtract 8 ones, so I will exchange a ten for 10 ones.*	 175 – 38 = 137
Representing subtraction problems **<u>Vocabulary</u>:** **Part-part-whole** **Represent** **Prove** **Check**		Use bar models to represent subtractions. 'Find the difference' is represented as two bars for comparison.  Bar models can also be used to show that a part must be taken away from the whole.	Children use alternative representations to check calculations and choose efficient methods. Children use inverse operations to check additions and subtractions.  I will check using addition.
Multiplication	**All children will be taught times tables to 12x12 and begin with formal written methods for short multiplication**		
	Concrete	**Pictorial**	**Abstract**
Understanding equal grouping and repeated	Children continue to build understanding of equal groups and the relationship with repeated addition.	Children recognise that arrays demonstrate commutativity.	Children understand the link between repeated addition and multiplication.

addition **Using commutativity to support understanding of the times-tables** **Vocabulary:** **Groups of** **Counting on** **Pattern** **Multiples** **Product** **Lots of** **Commutative** **Bar Model**	 Children recognise that arrays can be used to model commutative multiplications.  *I can see 2 groups of 6.* *I can see 6 groups of 2.* *2x6=12 6x2=12*	 *This is 3 groups of 4.* *This is 4 groups of 3.* *3x4=12* *4x3=12*	 *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.  *6 × 4 = 24*
Learning and understanding times-tables up to 12 × 12 **Vocabulary:** **Groups of** **Pattern** **Multiples** **Product** **Lots of** **Commutative** **Repeated**	Learn times tables to 12x12 Understand the special cases of multiplying by 1 and 0.  5 × 1 = 5 5 × 0 = 0	Represent the relationship between the ×9 table and the ×10 table.  Represent the ×11 table and ×12 tables in relation to the ×10 table.  *2 × 11 = 20 + 2*	Understand how times-tables relate to counting patterns. Understand links between the ×3 table, ×6 table and ×9 table *5 × 6 is double 5 × 3* ×5 table and ×6 table *I know that 7 × 5 = 35* *so I know that 7 × 6 = 35 + 7.* ×5 table and ×7 table *3 × 7 = 3 × 5 + 3 × 2*

addition		*3 × 11 = 30 + 3* *4 × 11 = 40 + 4*  4 × 12 = 40 + 8	 ×9 table and ×10 table *6 × 10 = 60* *6 × 9 = 60 − 6*
Multiplying a 2-digit number by a 1-digit number, expanded column method **<u>Vocabulary</u>:** **Place value** **Pattern** **Multiples** **Product** **Lots of**	Use place value equipment to model how 10 ones are exchanged for a 10 in some multiplications. *3 × 24 = ?* *3 × 20 = 60* *3 × 4 = 12*  *3 × 24 = 60 + 12* *3 × 24 = 70 + 2* *3 × 24 = 72*	Understand that multiplications may require an exchange of 1s for 10s, and also 10s for 100s. *4 × 23 = ?* 4 x 20 = 80 4 x 3 = 12 *4 × 23 = 92*	Short multiplication method 
Column multiplication for 2- and 3-digit numbers multiplied by a single digit **<u>Vocabulary</u>:**	Use place value equipment to make multiplications. 26 x 3  *There are 3 × 6 ones…* *18 ones*	Use place value equipment alongside a column method for multiplication of up to 3-digit numbers by a single digit.	Use the formal column method for up to 3-digit numbers multiplied by a single digit. 

Place value **Pattern** **Multiples** **Product** **Lots of**	*There are 3 × 2 tens …* *6 tens* *18 + 60 = 78*		
Division	**All children will be taught short division method (bus stop)**		
	Concrete	**Concrete**	**Concrete**
Understanding the relationship between multiplication and division, including times-tables **<u>Vocabulary</u>:** **Groups** **Share** **Share equally** **Place value** **Repeated subtraction** **Divide** **Remainder** **Factors** **Divisible** **Bar model**	Use objects to explore families of multiplication and division facts.  12 ÷ 3 = 4 12 = 4 × 3 3 ÷ 4 = 12 3 = 12 ÷ 4 3 × 12 = 4 3 × 4 = 12	Represent divisions using an array.  24÷4=6	Understand families of related multiplication and division facts. *I know that 5 × 7 = 35* *so I know all these facts:* *5 × 7 = 35* *7 × 5 = 35* *35 = 5 × 7* *35 = 7 × 5* *35 ÷ 5 = 7* *35 ÷ 7 = 5* *7 = 35 ÷ 5* 5 = 35 ÷ 7
Dividing 2-digit and 3-digit numbers by a	Partition into 10s and 1s to divide where appropriate. *39 ÷ 3 = ?*		Partition into 100s, 10s and 1s using a part-whole model to divide where appropriate.

single digit by partitioning into 100s, 10s and 1s **<u>Vocabulary</u>:** **Groups** **Share** **Share equally** **Place value** **Repeated subtraction** **Divide** **Remainder** **Factors** **Divisible** **Partition**	 *39 = 30 + 9* *30 ÷ 3 = 10* *9 ÷ 3 = 3* *39 ÷ 3 = 13* Use Base 10 equipment to divide where appropriate.	*142 ÷ 2 = ?*  *100 ÷ 2 = 50* *40 ÷ 2 = 20* *6 ÷ 2 = 3* *50 + 20 + 3 = 73* 142 ÷ 2 = 73
Dividing 2-digit and 3-digit numbers by a single digit, using short division **<u>Vocabulary</u>:** **Groups** **Share** **Share equally** **Place value** **Repeated subtraction** **Divide** **Remainder**	  	

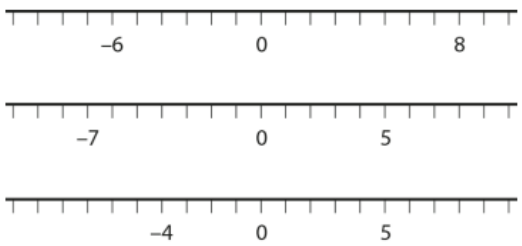
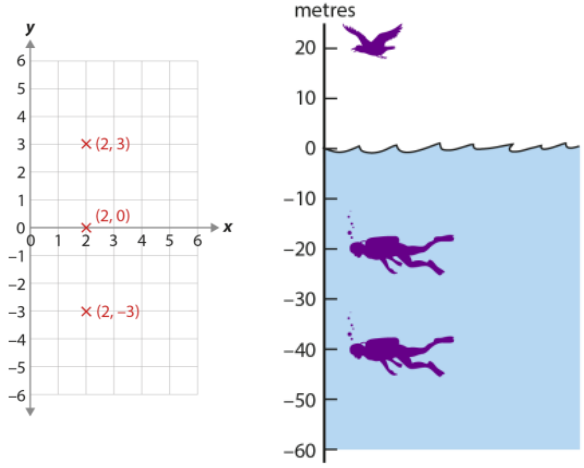
Factors **Divisible** **Partition**			
Understanding remainders **<u>Vocabulary</u>:** **Groups** **Share** **Share equally** **Place value** **Repeated subtraction** **Divide** **Remainder** **Factors** **Divisible** **Partition**	Use place value equipment to find remainders. *85 shared into 4 equal groups* *There are 24, and 1 that cannot be shared.* 	Represent the remainder as the part that cannot be shared equally.  72 ÷ 5 = 14 remainder 2	Understand how partitioning can reveal remainders of divisions. *80 ÷ 4 = 20* *12 ÷ 4 = 3* 95 ÷ 4 = 23 remainder 3

Years 5&6

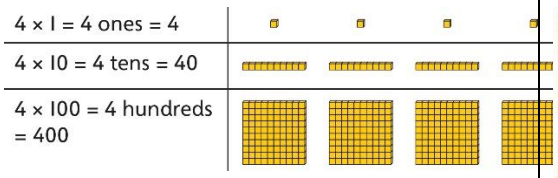
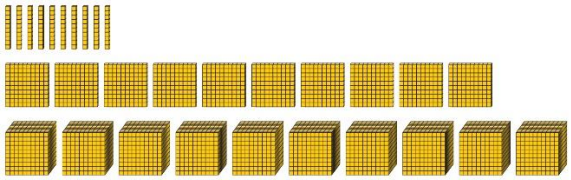
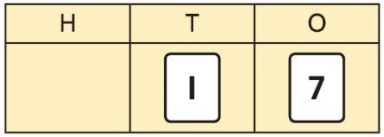
	Concrete	Pictorial	Abstract
Place value			

<table>
<tr>
<td>Use negative numbers in context, and calculate intervals across zero.

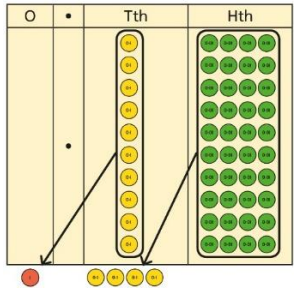
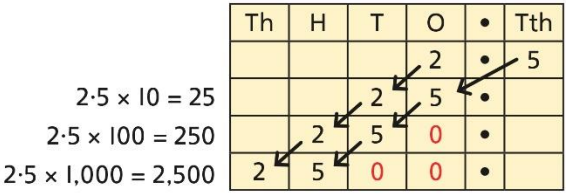
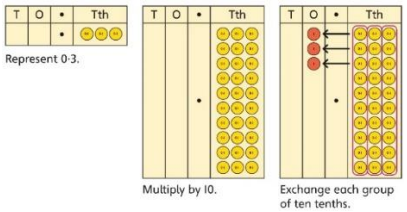
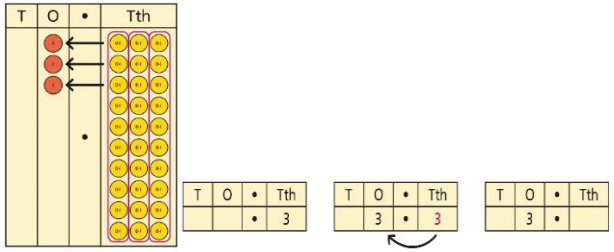
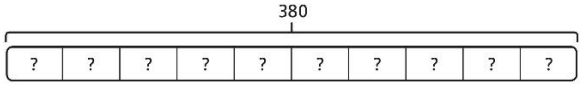
<u>Vocabulary</u>:

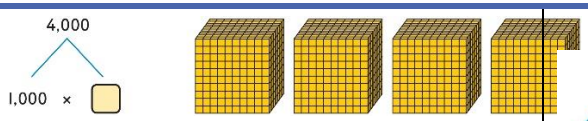
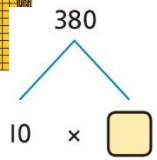
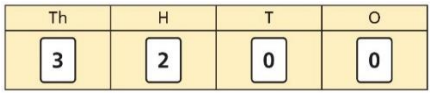
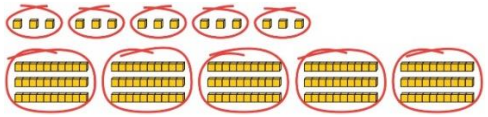
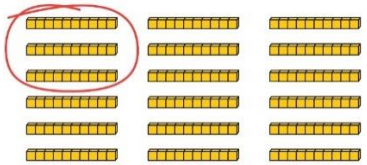
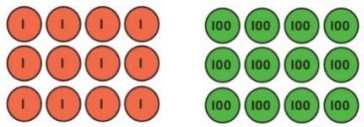
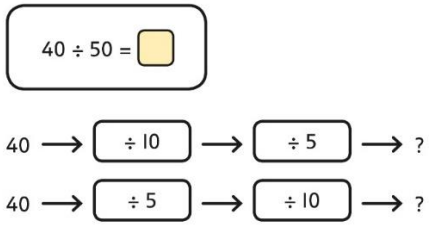
Zero
Negative
Difference</td>
<td>Count forward & backward through zero using a number line.
 
</td>
<td>Count forward & backward through zero within pictorial representation.
 
</td>
<td>Recognise difference between numbers below/above zero.
<table>
<tr><th colspan="2">Number pair</th><th>Positive number further from zero</th><th>Negative number further from zero</th><th>Both numbers same distance from zero</th></tr>
<tr><td>−6</td><td>12</td><td>✓</td><td></td><td></td></tr>
<tr><td>−12</td><td>6</td><td></td><td></td><td></td></tr>
<tr><td>−6</td><td>6</td><td></td><td></td><td></td></tr>
<tr><td>10</td><td>−1</td><td></td><td></td><td></td></tr>
<tr><td>10</td><td>−10</td><td></td><td></td><td></td></tr>
<tr><td>10</td><td>−100</td><td></td><td></td><td></td></tr>
</table></td>
</tr>
<tr>
<td>Multiplying by 10, 100 and 1,000

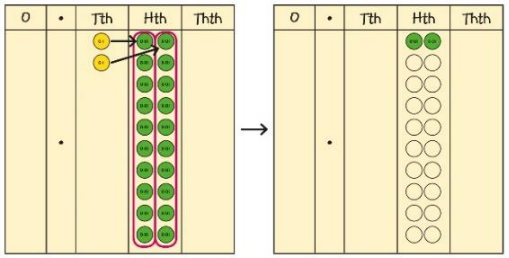
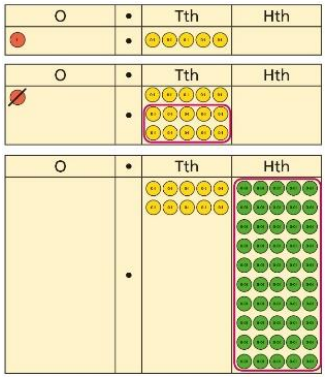
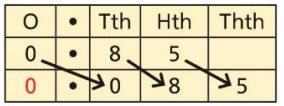
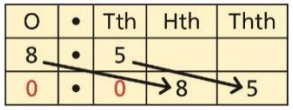
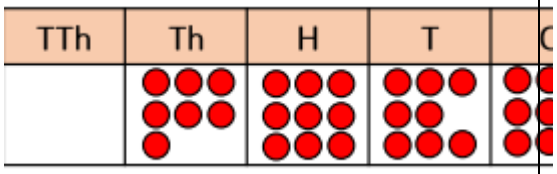
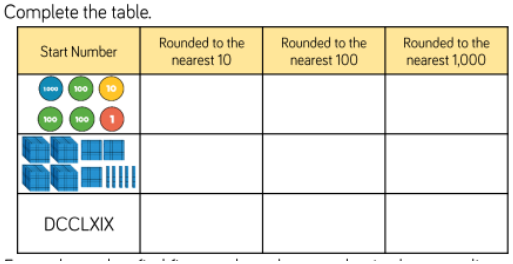
<u>Vocabulary</u>:

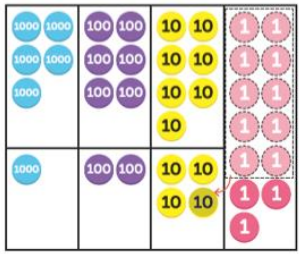
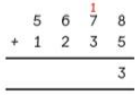
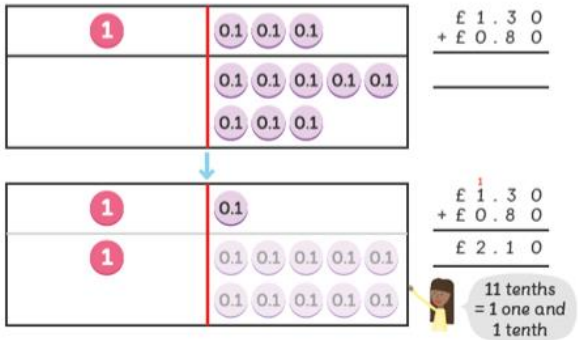
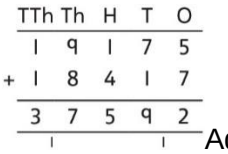
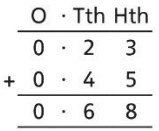
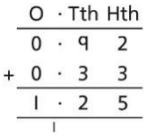
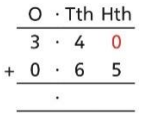
Groups of
Pattern
Multiples
Product
Lots of
Commutative
Bar Model
Repeated addition</td>
<td>Use place value equipment to multiply by 10, 100 and 1,000 by unitising.
 
</td>
<td>Understand the effect of repeated multiplication by 10.
  </td>
<td>Understand how exchange relates to the digits when multiplying by 10, 100 and 1,000.
 

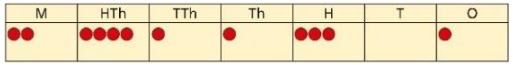
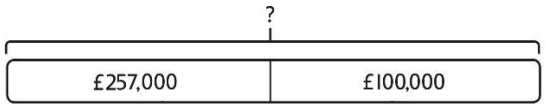
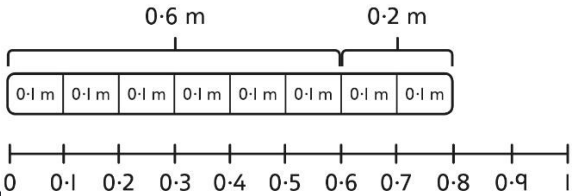
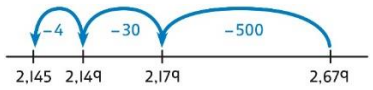
17 × 10 = 170
17 × 100 = 17 × 10 × 10 = 1,700
17 × 1,000 = 17 × 10 × 10 × 10 = 17,000</td>
</tr>
<tr>
<td>Multiplying</td>
<td>Use place value equipment to explore</td>
<td>Represent multiplication by 10 as exchange on</td>
<td>Understand how this exchange is</td>
</tr>
</table>

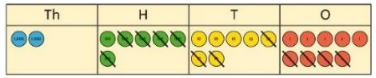
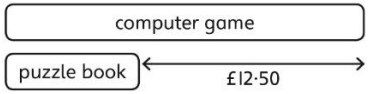
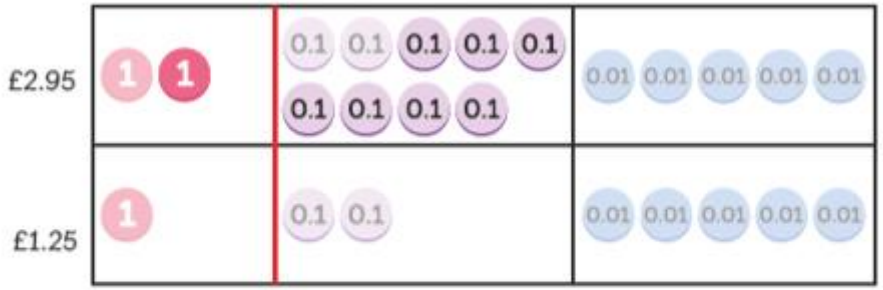
decimals by 10, 100 and 1,000 **<u>Vocabulary</u>:** **Place value** **Groups of** **Pattern** **Multiples** **Product** **Lots of** **Repeated addition**	and understand the exchange of 10 tenths, 10 hundredths or 10 thousandths.	a place value grid.  0·14 × 10 = 1·4	represented on a place value chart. 
Multiplying by 10, 100 and 1,000 **<u>Vocabulary</u>:** **Groups of** **Pattern** **Place value** **Multiples** **Product** **Lots of** **Commutative** **Bar Model**	Use place value equipment to explore exchange in decimal multiplication.  *0·3 × 10 = ?* *0·3 is 3 tenths.* *10 × 3 tenths are 30 tenths.* *30 tenths are equivalent to 3 ones.*	Understand how the exchange affects decimal numbers on a place value grid.  0·3 × 10 = 3	Use knowledge of multiplying by 10, 100 and 1,000 to multiply by multiples of 10, 100 and 1,000. *8 × 100 = 800* *8 × 300 = 800 × 3* *= 2,400* *2·5 × 10 = 25* *2·5 × 20 = 2·5 × 10 × 2* *= 50*
Dividing whole numbers by 10, 100 and 1,000	Use place value equipment to support unitising for division. *4,000 ÷ 1,000*	Use a bar model to support dividing by unitising. *380 ÷ 10 = 38*  	Understand how and why the digits change on a place value grid when dividing by 10, 100 or 1,000.

<u>Vocabulary</u>: **Groups of** **Pattern** **Place value** **Factors** **Times tables**	 *4,000 is 4 thousands.* *4 × 1,000= 4,000* *So, 4,000 ÷ 1,000 = 4*	 *380 is 38 tens.* *38 × 10 = 380* *10 × 38 = 380* *So, 380 ÷ 10 = 38*	 *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.*
Dividing by multiples of 10, 100 and 1,000 **<u>Vocabulary</u>:** **Groups of** **Pattern** **Place value** **Factors** **Times tables**	Use place value equipment to represent known facts and unitising.  *15 ones put into groups of 3 ones.* *There are 5 groups.* *15 ÷ 3 = 5* *15 tens put into groups of 3 tens. There are 5 groups.* *150 ÷ 30 = 5*	Represent related facts with place value equipment when dividing by unitising.  *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.*	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* Use knowledge of factors to divide by multiples of 10, 100 and 1,000.  *40 ÷ 5 = 8* *8 ÷ 10 = 0·8*

		1200 ÷ 400 = 3	So, 40 ÷ 50 = 0·8
Dividing decimals by 10, 100 and 1,000 **<u>Vocabulary</u>:** **Groups of** **Pattern** **Place value** **Factors** **Times tables**	Understand division by 10 using exchange. *2 ones are 20 tenths.* *20 tenths divided by 10 is 2 tenths.* Use place value equipment to explore division as exchange.  Exchange each 0·1 for ten 0·01s. Divide 20 counters by 10. *0·2 is 2 tenths.* *2 tenths is equivalent to 20 hundredths.* *20 hundredths divided by 10 is 2 hundredths.*	Represent division using exchange on a place value grid.  *1·5 is 1 one and 5 tenths.* *This is equivalent to 10 tenths and 50 hundredths.* *10 tenths divided by 10 is 1 tenth.* *50 hundredths divided by 10 is 5 hundredths.* *1·5 divided by 10 is 1 tenth and 5 hundredths.* 1·5 ÷ 10 = 0.15	Understand the movement of digits on a place value grid.  *0·85 ÷ 10 = 0·085*  8·5 ÷ 100 = 0·085
Round to the nearest 10 / 100 / 1000 / 10,000 **<u>Vocabulary</u>:** **Place value** **To the nearest** **Round up** **Round down**	 use place value chart to round to the nearest 100, 1000, 10,000	Complete the table.  	**Round to the nearest 10 / 100 / 1000 / 10,000**

Place value		Round 85,617 • To the nearest 10 • To the nearest 100 • To the nearest 1,000 • To the nearest 10,000	
Addition & Subtraction	**All children will be taught: column addition** **Place value equipment will be used to represent additions and support mathematics where necessary**		
Column addition with whole numbers **Adding decimals using column addition** **<u>Vocabulary</u>:** **Addition** **Place value** **Sum** **Total** **Altogether** **Increase** **Counting on** **Greater**	Use place value equipment to represent additions.  	Represent additions, using place value equipment on a place value grid alongside written methods. 	Use column addition, including exchanges.  Add using a column method, ensuring that children understand the link with place value.   Include exchange where required, alongside an understanding of place value. Include additions where the numbers of decimal places are different.  *3.4 + 0.65 = ?*
Selecting mental methods for larger numbers	Represent 7-digit numbers on a place value grid, and use this to support thinking and mental methods.	Use a bar model to support thinking in addition problems. *257,000 + 99,000 = ?*	Use place value and unitising to support mental calculations with larger numbers. *195,000 + 6,000 = ?*

where appropriate **<u>Vocabulary</u>:** **Addition** **Place value** **Sum** **Total** **Altogether** **Increase** **Counting on** **Greater**	 *2,411,301 + 500,000 = ?* *This would be 5 more counters in the HTh place.* *So, the total is 2,911,301.* *2,411,301 + 500,000 = 2,911,301*	 *I added 100 thousands then subtracted 1 thousand.* *257 thousands + 100 thousands = 357 thousands* *257,000 + 100,000 = 357,000* *357,000 – 1,000 = 356,000* *So, 257,000 + 99,000 = 356,000*	*195 + 5 + 1 = 201* *195 thousands + 6 thousands = 201 thousands* *So, 195,000 + 6,000 = 201,000*
Other representations and methods may include:			
Adding tenths **<u>Vocabulary</u>:** **Number line** **Bar Model**	Link measure with addition of decimals. *Two lengths of fencing are 0·6 m and 0·2 m.* *How long are they when added together?*  	Use a bar model with a number line to add tenths.  *0·6 + 0·2 = 0·8* *6 tenths + 2 tenths = 8 tenths*	Understand the link with adding fractions. $\frac{6}{10} + \frac{2}{10} = \frac{8}{10}$ *6 tenths + 2 tenths = 8 tenths* *0·6 + 0·2 = 0·8*
Subtraction	**All children will be taught: column subtraction**		
	Concrete	**Pictorial**	**Abstract**
Column subtraction with whole numbers **<u>Vocabulary</u>:**	By Y6 compare subtraction methods alongside place value representations.  		Use column subtraction methods with exchange where required.

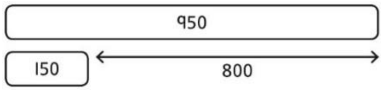
Exchange	 Th H T O 2 6 7 9 – 5 3 4 2 1 4 5 Use a bar model to represent calculations, including 'find the difference' with two bars as comparison. 	TTh Th H T O 5 11 1 6 2 10 9 7 – 1 8 5 3 4 4 3 5 6 3 *62,097 − 18,534 = 43,563*
Subtracting decimals **<u>Vocabulary</u>:** **Count back** **Fewer** **Minus** **Decrease** **Take (away)** **Less** **Subtract** **Subtraction** **Exchange**	 £2.95 − £1.25 =	Use column subtraction, with an understanding of place value, including subtracting numbers with different numbers of decimal places. *3·921 − 3·75 = ?* O · Tth Hth Thth 3 · 9 2 1 – 3 · 7 5 0 ·

<table>
<tr>
<td>Subtracting mentally with larger numbers

<u>Vocabulary</u>:

Count back
Fewer
Minus
Decrease
Take (away)
Less
Subtract
Subtraction
Exchange
Bridging</td>
<td>Use a bar model to show how unitising can support mental calculations.

950,000 − 150,000
That is 950 thousands − 150 thousands

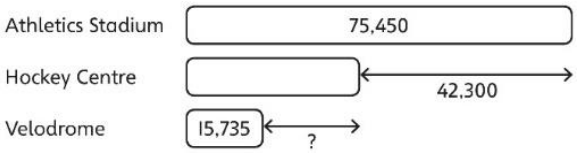
 

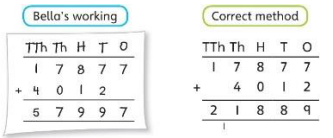
So, the difference is 800 thousands.
950,000 − 150,000 = 800,000</td>
<td>Subtract efficiently from powers of 10.

10,000 − 500 = ?</td>
</tr>
<tr>
<td colspan="3">Other representations and methods may include:</td>
</tr>
<tr>
<td>Checking strategies and representing subtractions

<u>Vocabulary</u>:

Prove
Check
Represent</td>
<td>Bar models represent subtractions in problem contexts, including ‘find the difference’.

 
</td>
<td>Children can explain the mistake made when the columns have not been ordered correctly.

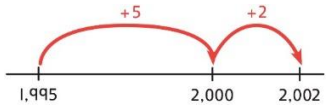
 

Use approximation to check calculations.

I calculated 18,000 + 4,000 mentally to check my subtraction.</td>
</tr>
<tr>
<td>Choosing efficient methods</td>
<td colspan="2">To subtract two large numbers that are close, children find the difference by counting on.
2,002 − 1,995 = ?</td>
</tr>
</table>

Vocabulary:

Prove
Check
Represent



Use addition to check subtractions.
I calculated 7,546 − 2,355 = 5,191.
I will check using the inverse.

Multiplication	**By year 5: All children should know or learn all multiplication facts to 12x12. Where they don't this will be taught and given as home learning.**
All children will be taught: short and long multiplication methods	

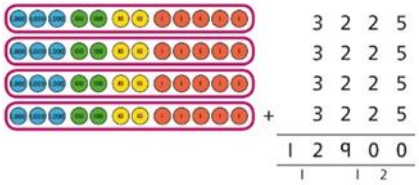
Multiplying up to 4-digit numbers by a single digit

Vocabulary:

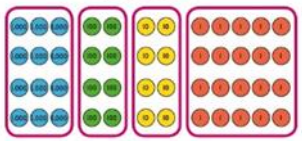
Groups of
Pattern
Multiples
Product
Lots of
Commutative
Bar Model
Repeated addition
Array

By Y6 use place value & equipment to compare methods

Method 1



Method 2



Use an area model and then add the parts.

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

Use a column multiplication, including any required exchanges.

$$\begin{array}{r} 1\ 3\ 6 \\ \times\quad 6 \\ \hline 8\ 1\ 6 \\ \scriptstyle 2\ 3 \end{array}$$

By Y6 use efficient strategies

Multiplying 2-digit numbers by 2-digit numbers **<u>Vocabulary</u>:** **Groups of** **Pattern** **Multiples** **Product** **Lots of** **Commutative** **Bar Model** **Repeated addition**	Use column multiplication, ensuring understanding of place value at each stage. 34×7 34×20 34×27
Multiplying up to 4-digits by 2-digits **<u>Vocabulary</u>:** **Groups of** **Pattern** **Multiples** **Product** **Lots of** **Commutative** **Bar Model** **Repeated addition**	Use column multiplication, ensuring understanding of place value at each stage. 143×2 143×10 143×12 $1{,}274 \times 2$ $1{,}274 \times 30$ $1{,}274 \times 32$ *1,274 × 32 = 40,768*

Multiplying decimals

<u>Vocabulary</u>:

Groups of
Pattern
Multiples
Product
Lots of
Commutative
Bar Model
Repeated addition

Use known facts to multiply decimals.

4 × 3 = 12
4 × 0·3 = 1·2
4 × 0·03 = 0·12

20 × 5 = 100
20 × 0·5 = 10
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 = ?

	H	T	O	•	Tth	Hth
2 × 3			6	•		
0·2 × 3			0	•	6	
0·02 × 3				•		

Use a place value grid to understand the effects of multiplying decimals.

Other representations and methods may include:

Understanding factors

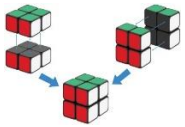
<u>Vocabulary</u>:

Times tables
Representation
Lots of
Groups of
Total
Multiplication
Division

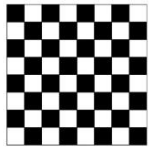
Use Cuisenaire, cubes or counters to explore the meaning of 'square numbers'.

25 is a square number because it is made from 5 rows of 5.

Use cubes to explore cube numbers.



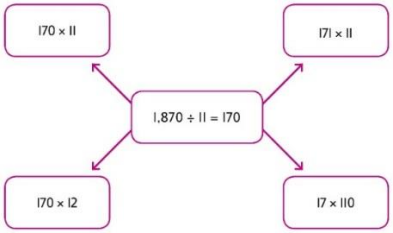
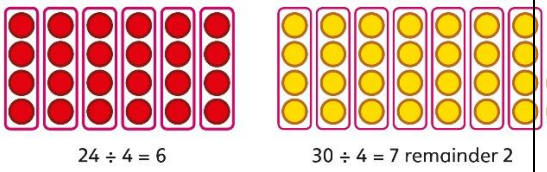
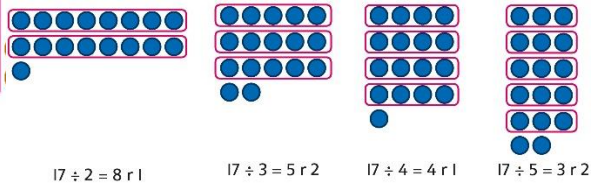
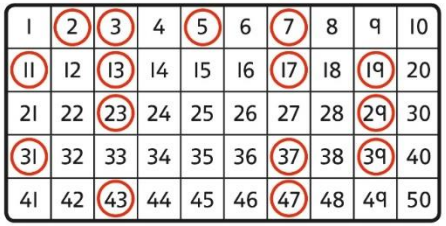
Use images to explore examples and non-examples of square numbers.

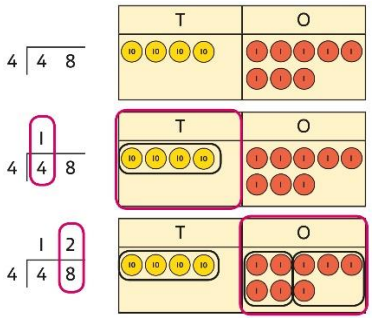
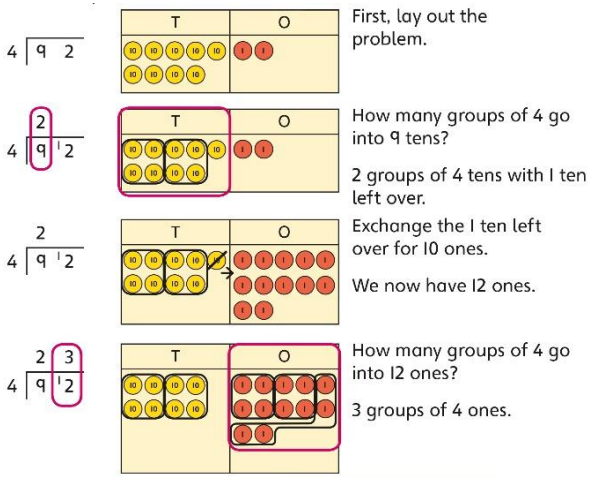
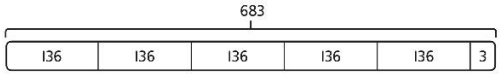


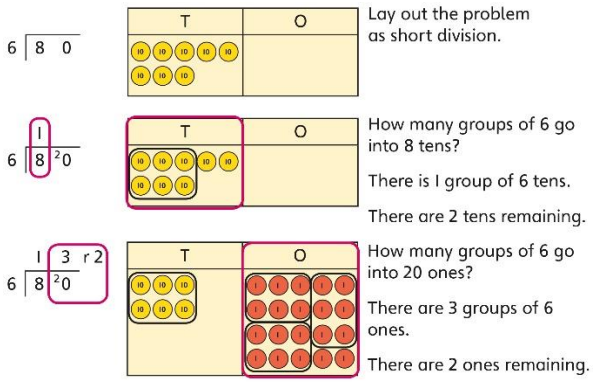
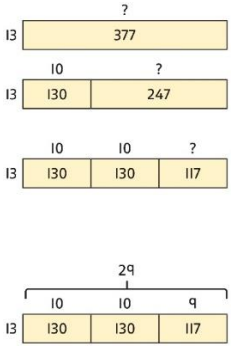
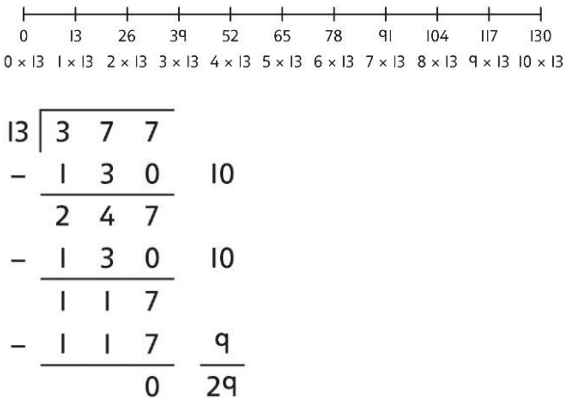
8 × 8 = 64
8^2 = 64

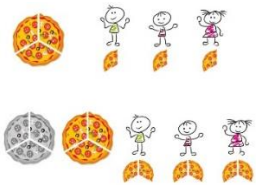
Understand the pattern of square numbers in the multiplication tables.
Use a multiplication grid to circle each square number. Can children spot a pattern?

Use a known fact to generate families of related facts.

Product	*8 is a cube number.*		 Use factors to calculate efficiently. *15 × 16* *= 3 × 5 × 2 × 8* *= 3 × 8 × 2 × 5* *= 24 × 10* *= 240*
Understanding factors **<u>Vocabulary</u>:** **Times tables** **Representation** **Lots of** **Groups of** **Total** **Multiplication** **Division** **Product**	Use equipment to explore different factors of a number.  *4 is a factor of 24 but is not a factor of 30.*	Recognise prime numbers as numbers having exactly two factors. Understand the link with division and remainders. 	Recognise and know primes up to 100. Understand that 2 is the only even prime, and that 1 is not a prime number. 
Division	**All children will be taught: short and long division methods**		
Dividing up to four digits by a single digit using short division	Explore grouping using place value equipment. *268 ÷ 2 = ?* *There is 1 group of 2 hundreds.*	Use place value equipment on a place value grid alongside short division. The model uses grouping. A sharing model can also be used, although the model would need adapting.	Use short division for up to 4-digit numbers divided by a single digit. $\begin{array}{r} 0\ 5\ 5\ 6 \\ 7\overline{)\ 3\ {}^{3}8\ {}^{3}9\ {}^{4}2} \end{array}$

Dividing decimals **Understanding inverse operations and the link with multiplication & division** **<u>Vocabulary</u>:** **Groups** **Share** **Share equally** **Place value** **Repeated subtraction** **Divide** **Remainder** **Factors** **Divisible** **Partition** **Inverse** **Times tables**	*There are 3 groups of 2 tens.* *There are 4 groups of 2 ones.* *264 ÷ 2 = 134*	 Lay out the problem as a short division. *There is 1 group of 4 in 4 tens.* *There are 2 groups of 4 in 8 ones.* Work with divisions that require exchange.  	*3,892 ÷ 7 = 556* **Use multiplication to check.** *556 × 7 = ?* *6 × 7 = 42* *50 × 7 = 350* *500 × 7 = 3500* *3,500 + 350 + 42 = 3,892* Use short division to divide decimals with up to 2 decimal places. 8 | 4 · 2 4 0 · 8 | 4 · 2 4 0 · 5 8 | 4 · 2 2 4 0 · 5 3 8 | 4 · 2 2 4
Understanding remainders **<u>Vocabulary</u>:**	Understand remainders using concrete versions of a problem. *80 cakes divided into trays of 6.* 	Use short division and understand remainders as the last remaining 1s.	In problem solving contexts, represent divisions including remainders with a bar model. 

Equal groups **Left over** **Remainder**	*80 cakes in total. They make 13 groups of 6, with 2 remaining.*		*683 = 136 × 5 + 3* *683 ÷ 5 = 136 r 3*
Dividing by a 2-digit number using long division **Understanding inverse operations and the link with multiplication & division** **<u>Vocabulary</u>:** **Groups** **Share** **Share equally** **Place value** **Repeated subtraction** **Divide** **Remainder** **Factors** **Divisible**	Use equipment to build numbers from groups.  *182 divided into groups of 13.* *There are 14 groups.*	Use an area model alongside written division to model the process. *377 ÷ 13 = ?*  *377 ÷ 13 = 29*	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. *377 ÷ 13 = ?*  *377 ÷ 13 = 29* A slightly different layout may be used, with the division completed above rather than at

Partition **Inverse** **Times tables**			the side. $\begin{array}{r} \quad 3 \\ 21\overline{)\,7\;9\;8} \\ -\;6\;3\;0 \\ \hline \quad 1\;6\;8 \end{array}$ $\begin{array}{r} \quad 3\;8 \\ 21\overline{)\,7\;9\;8} \\ -\;6\;3\;0 \\ \hline \quad 1\;6\;8 \\ -\;1\;6\;8 \\ \hline \quad\quad 0 \end{array}$ Divisions with a remainder explored in problem-solving contexts.
Other representations and methods may include:			
Understanding the relationship between fractions and division **<u>Vocabulary</u>:** **Groups** **Share** **Share equally** **Part-part-whole** **Divide**	Use sharing to explore the link between fractions and division. *1 whole shared between 3 people.* *Each person receives one-third.* 	Use a bar model and other fraction representations to show the link between fractions and division.  $1 \div 3 = \frac{1}{3}$	Use the link between division and fractions to calculate divisions. $5 \div 4 = \frac{5}{4} = 1\frac{1}{4}$ $11 \div 4 = \frac{11}{4} = 2\frac{3}{4}$
Dividing by a 2-digit number using factors	Understand that division by factors can be used when dividing by a number that is not prime.	Use factors and repeated division. *1,260 ÷ 14 = ?*	Use factors and repeated division where appropriate.

<u>Vocabulary</u>: **Groups** **Share** **Share equally** **Part-part-whole** **Divide** **Multiples** **Factors** **Product** **Times tables**		 *1,260 ÷ 2 = 630* *630 ÷ 7 = 90* *1,260 ÷ 14 = 90*	*2,100 ÷ 12 = ?*