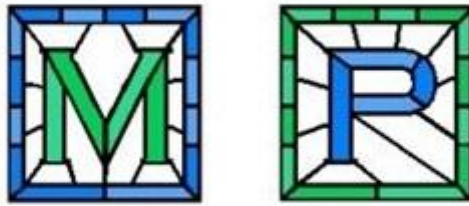


**Monkfield Park**



**Primary School and  
Care & Learning Centre**

# **Calculation Policy**

Summer 2022

## **Introduction**

This policy has been written to meet the requirements of the National Curriculum 2014 for the teaching and learning of mathematics at Monkfield Park. It sets out the progression in the teaching and learning of calculation and is designed to ensure that children develop a deep understanding of mathematical concepts and calculation methods to mastery level.

## **Aims of the Policy**

This policy aims to ensure:

- There is consistency and progression in Monkfield Park's approach to calculation in all year groups;
- That children build their understanding of the four operations within the curriculum requirements of each year group starting with concrete, building to pictorial, and finishing with abstract (formal written method);
- Children can use learnt methods accurately with confidence and understanding.

## **Organisation and the mastery approach**

The following pages show how the consistent use of the CPA (concrete, pictorial, abstract) approach across *Power Maths* helps children to develop their calculation in the four operations to mastery in an efficient and reliable way, by building confidence in their understanding of both written and mental methods.

The reception section of this policy has been created by the reception teaching team to best reflect their practice. The KS1, LKS2 and UKS2 calculation policies provided by *Power Maths* form the basis of the years 1-6 section of this policy. Within our year groups we adapted the policies to best reflect our current practice.

Whilst methods and resources for lower year groups may be necessary to support children working towards the expected standard, children working at greater depth should be extended through mastery challenges instead of teaching to the curriculum of the next year group.

Children will use mental methods as their first port of call when appropriate, but for calculations that they cannot do in their heads, they will need to use an alternative method which may be with the aid of concrete resources, pictorial (jottings), abstract (formal written method) or a combination of these. The policy outlines a range of mental calculation strategies, including the use of jottings, vocabulary to be developed and the key number facts that children will need to know

It is important that any type of calculation is given a real life context or problem solving approach to help build children's understanding of the purpose of calculation, and to help them recognise when to use certain operations and methods when faced with problems. This is central to the *Power Maths* approach adopted at Monkfield Park.

Children will have weekly 'Number Talk' sessions in the form of maths starters which support them to explore the most effective method for calculating and share their current method, alongside trying new methods that are accessible to them.

Children need to be taught and encouraged to use the following processes in deciding their approach to a calculation and to ensure they select the most appropriate method:

1. Is it possible to complete the calculation using mental strategies? If yes, which is most efficient? Can you think of an alternative method to check? If no, see 2.
2. Can the calculation be done efficiently using mental strategies supported by jottings? If yes, which is most efficient? Can you think of an alternative method to check? If no, see 3.
3. Use an abstract (formal written) calculation method. Which is most efficient? Can you think of an alternative method to check?

### **Fluency in Number**

Developing children's fluency in number facts is considered paramount in order for them to calculate. Please see Maths Policy for details on developing number fluency at Monkfield Park.

### **Inclusion**

Monkfield Park aims to be responsive to all aspects of diversity and to increase the learning and participation of all children within the school and its locality. We are developing inclusive values which are shared between all staff, children, governors, parents/carers and the wider community, in a secure, accepting, collaborative and stimulating environment. Everyone is valued and diversity is seen as a rich resource to enhance and support the learning of all.

This inclusive culture is reflected in all policies and practices. We ensure that classroom and extra-curricular activities encourage the participation of all children, drawing on their knowledge and experience outside school. Teaching and support staff are integrated together, enabling all children to overcome barriers to learning and participate fully in the life of Monkfield Park.

Equality and inclusion will be achieved through analysis and assessment of children's needs, by monitoring the quality of teaching and the standards of children's achievements and by setting targets for improvement. Learning for all children is given equal priority and all available resources are used to maximum effect.

Monkfield Park Primary meets the specific duties of the Race Relations Amendment Act (2000) by considering the implications for race equality and cultural diversity in planning and developing all policies. For further details refer to the Equality and Diversity policy.

Children with Special Educational Needs and disabilities will be given support to access the curriculum at an appropriate level to enable them to reach their full potential.



## Calculation Guidelines for Foundation Stage

### ADDITION

### SUBTRACTION

### MULTIPLICATION

### DIVISION

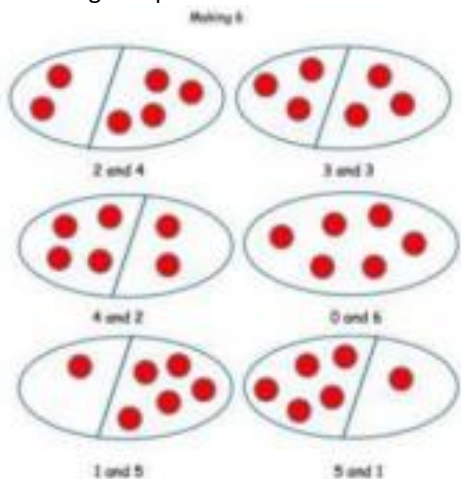
**Children begin to record in the context of play or practical activities and problems.**

Begin to relate addition to combining two groups of objects. Strategies include:

- Make a record in pictures, words or symbols of addition activities already carried out.
- Construct number sentences to go with practical activities.
- Use of games, songs and practical activities to begin using vocabulary.

Examples:

Exploring part part whole relationship— combining two parts to make a whole.



Starting at the bigger number and counting on.

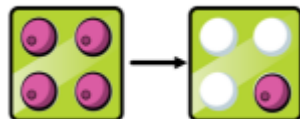
Using the ten frame to support the addition of single digit numbers.

Begin to relate subtraction to 'taking away'. Strategies include:

- Make a record in pictures, words or symbols of subtraction activities already carried out.
- Use of games, songs and practical activities to begin using vocabulary
- Construct number sentences to go with practical activities.
- Relate subtraction to taking away and counting how many objects are left.

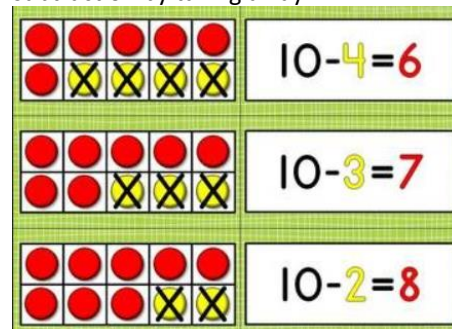
Examples:

Taking away ones using concrete objects or



Counting back:  
Using concrete strategies for counting.

Using the ten frames to support subtraction by taking away.



Real life contexts and use of practical equipment to count in repeated groups of the same size. Strategies include:

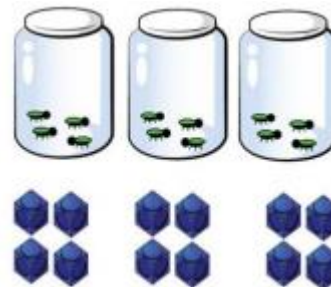
- Count in twos; fives; tens.
- Also chanting/singing in 2s, 5s and 10s.
- Recognising and making equal groups.

Examples:

Recognising and making equal groups (repeated grouping/repeated addition)

E.g.  $3 \times 4 = 12$   
 $4 + 4 + 4 = 12$

There are 3 equal groups, with 4 in each group



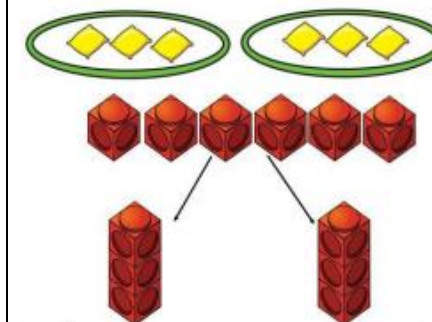
Doubling using practical activities using manipulatives including cubes and Numicon to demonstrate doubling.

Share objects into equal groups. Strategies include:

- Sharing objects during the school day, e.g. sharing fruit at break time, sharing sweets on a child's birthday.
- Counting objects in in tens/twos.
- Separate a given number of objects into two groups.
- Use related vocabulary (sharing, groups of, etc).

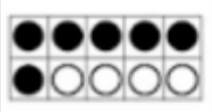
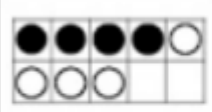
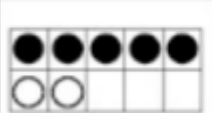
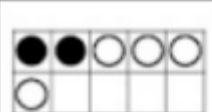
Examples:

Sharing practical objects into groups



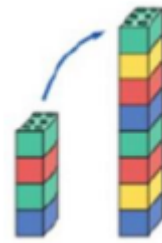
Hearing and being exposed to language to describe half and seeing visual representations of half.



	$6+4=10$
	$4+4=8$
	$5+2=7$
	$2+4=6$

Solving problems using concrete or pictorial representations.

Solving problems using concrete or pictorial representations.



$$\square + \square = \square$$

$$\square + \square = \square$$

## KEY STAGE 1

Children develop the core ideas that underpin all calculation. They begin by connecting calculation with counting on and counting back, but they should learn that understanding wholes and parts will enable them to calculate efficiently and accurately, and with greater flexibility. They learn how to use an understanding of 10s and 1s to develop their calculation strategies, especially in addition and subtraction.

**Key language:** whole, part, ones, ten, tens, number bond, add, addition, plus, total, altogether, subtract, subtraction, find the difference, take away, minus, less, more, group, share, equal, equals, is equal to, groups, equal groups, times, multiply, multiplied by, divide, share, shared equally, times-table

**Addition and subtraction:** Children first learn to connect addition and subtraction with counting, but they soon develop two very important skills: an understanding of parts and wholes, and an understanding of unitising 10s, to develop efficient and effective calculation strategies based on known number bonds and an increasing awareness of place value. Addition and subtraction are taught in a way that is interlinked to highlight the link between the two operations.

A key idea is that children will select methods and approaches based on their number sense. For example, in Year 1, when faced with  $15 - 3$  and  $15 - 13$ , they will adapt their ways of approaching the calculation appropriately. The teaching should always emphasise the importance of mathematical thinking to ensure accuracy and flexibility of approach, and the importance of using known number facts to harness their recall of bonds within 20 to support both addition and subtraction methods.

In Year 2, they will start to see calculations presented in a column format, although this is not expected to be formalised until KS2. We show the column method in Year 2 as an option; teachers may not wish to include it until Year 3.

**Multiplication and division:** Children develop an awareness of equal groups and link this with counting in equal steps, starting with 2s, 5s and 10s. In Year 2, they learn to connect the language of equal groups with the mathematical symbols for multiplication and division.

They learn how multiplication and division can be related to repeated addition and repeated subtraction to find the answer to the calculation.


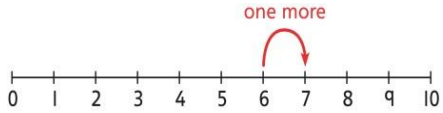
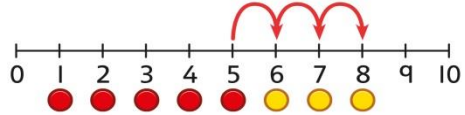

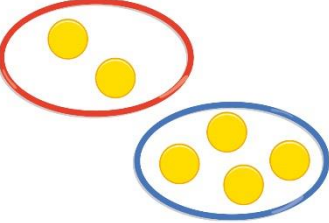
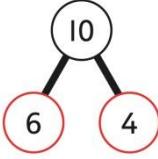
In this key stage, it is vital that children explore and experience a variety of strong images and manipulative representations of equal groups, including concrete experiences as well as abstract calculations.

Children begin to recall some key multiplication facts, including doubles, and an understanding of the 2, 5 and 10 times-tables and how they are related to counting.

**Fractions:** In Year 1, children encounter halves and quarters, and link this with their understanding of sharing. They experience key spatial representations of these fractions, and learn to recognise examples and non-examples, based on their awareness of equal parts of a whole.

In Year 2, they develop an awareness of unit fractions and experience non-unit fractions, and they learn to write them and read them in the common format of numerator and denominator.

Year 1

	Concrete	Pictorial	Abstract
Year 1 Addition	<p><b>Counting and adding more</b> Children add one more person or object to a group to find one more.</p>	<p><b>Counting and adding more</b> Children add one more cube or counter to a group to represent one more.</p>  <p><i>One more than 4 is 5.</i></p>	<p><b>Counting and adding more</b> Use a number line to understand how to link counting on with finding one more.</p>  <p><i>One more than 6 is 7. 7 is one more than 6.</i></p> <p>Learn to link counting on with adding more than one.</p>  <p><math>5 + 3 = 8</math></p>
	<p><b>Understanding part-part-whole relationship</b> Sort people and objects into parts and understand the relationship with the whole.</p>  <p><i>The parts are 2 and 4. The whole is 6.</i></p>	<p><b>Understanding part-part-whole relationship</b> Children draw to represent the parts and understand the relationship with the whole.</p>  <p><i>The parts are 1 and 5. The whole is 6.</i></p>	<p><b>Understanding part-part-whole relationship</b> Use a part-whole model to represent the numbers.</p>  <p><math>6 + 4 = 10</math></p> <p><math>6 + 4 = 10</math></p>

**Concrete**

**Knowing and finding number bonds within 10**

Break apart a group and put back together to find and form number bonds.



$3 + 4 = 7$

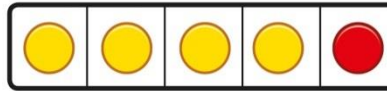


$6 = 2 + 4$

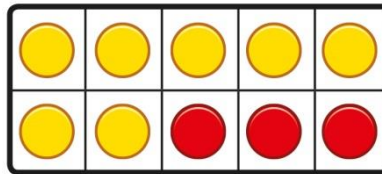
**Pictorial**

**Knowing and finding number bonds within 10**

Use five and ten frames to represent key number bonds.



$5 = 4 + 1$

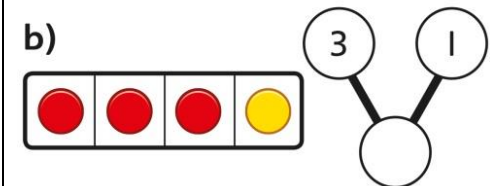
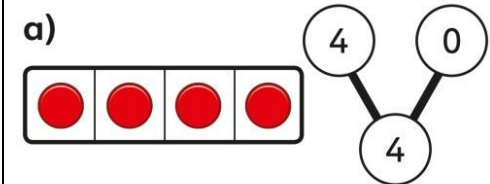


$10 = 7 + 3$

**Abstract**

**Knowing and finding number bonds within 10**

Use a part-whole model alongside other representations to find number bonds. Make sure to include examples where one of the parts is zero.



$4 + 0 = 4$

$3 + 1 = 4$

**Understanding teen numbers as a complete 10 and some more**

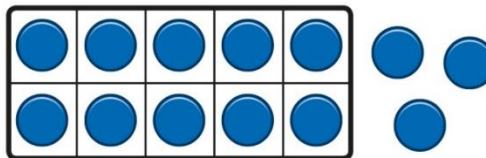
Complete a group of 10 objects and count more.



*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.*

$10 + 3 = 13$

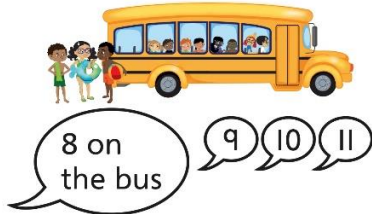


Year 1

**Concrete**

**Adding by counting on**

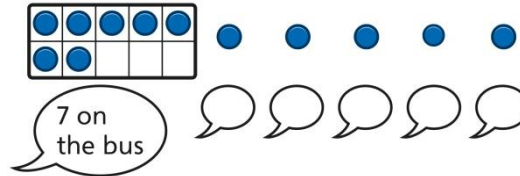
Children use knowledge of counting to 20 to find a total by counting on using people or objects.



**Pictorial**

**Adding by counting on**

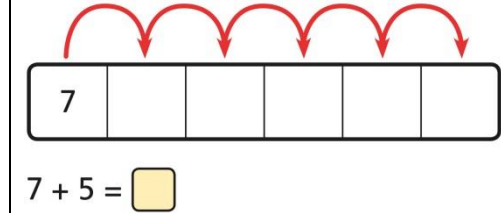
Children use counters to support and represent their counting on strategy.



**Abstract**

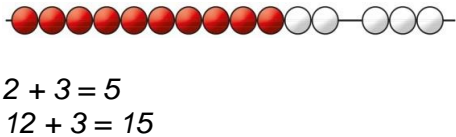
**Adding by counting on**

Children use number lines or number tracks to support their counting on strategy.



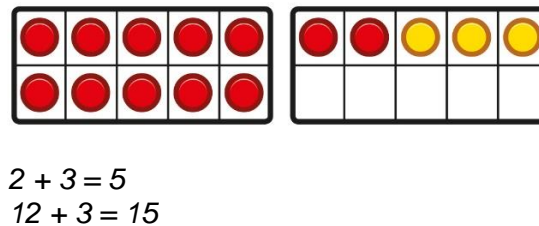
**Adding the 1s**

Children use bead strings to recognise how to add the 1s to find the total efficiently.



**Adding the 1s**

Children represent calculations using ten frames to add a teen and 1s.



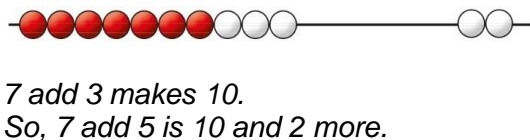
**Adding the 1s**

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,  $13 + 5 = 18$

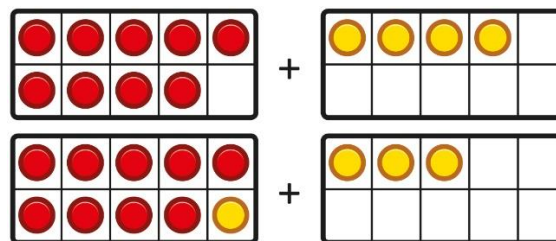
**Bridging the 10 using number bonds**

Children use a bead string to complete a 10 and understand how this relates to the addition.



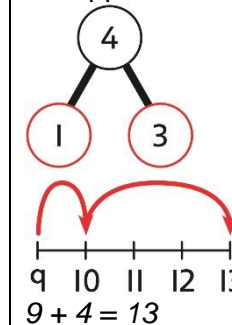
**Bridging the 10 using number bonds**

Children use counters to complete a ten frame and understand how they can add using knowledge of number bonds to 10.

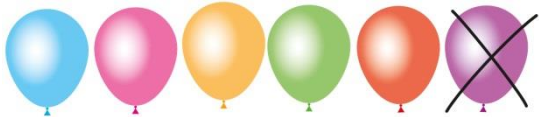


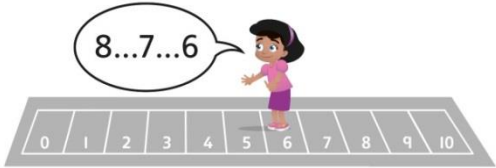
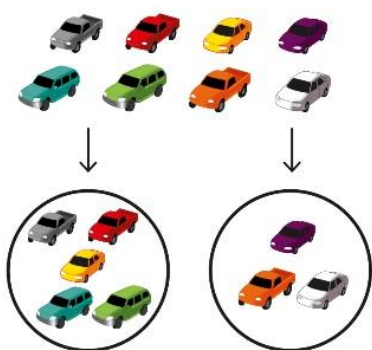
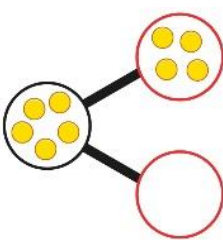
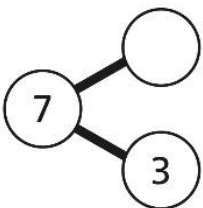
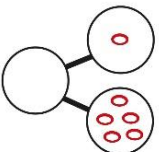


**Bridging the 10 using number bonds**

Use a part-whole model and a number line to support the calculation.



Year 1

	Concrete	Pictorial	Abstract
<b>Year 1 Subtraction</b>	<p><b>Counting back and taking away</b> Children arrange objects and remove to find how many are left.</p>  <p>1 less than 6 is 5. 6 subtract 1 is 5.</p>	<p><b>Counting back and taking away</b> Children draw and cross out or use counters to represent objects from a problem.</p>   <p><math>9 - \square = \square</math> There are <math>\square</math> children left.</p>	<p><b>Counting back and taking away</b> Children count back to take away and use a number line or number track to support the method.</p>  <p><math>9 - 3 = 6</math></p>
	<p><b>Finding a missing part, given a whole and a part</b> Children separate a whole into parts and understand how one part can be found by subtraction.</p>  <p><math>8 - 5 = ?</math></p>	<p><b>Finding a missing part, given a whole and a part</b> Children represent a whole and a part and understand how to find the missing part by subtraction.</p>  <p><math>5 - 4 = \square</math></p>	<p><b>Finding a missing part, given a whole and a part</b> Children use a part-whole model to support the subtraction to find a missing part.</p>  <p><math>7 - 3 = ?</math></p> <p>Children develop an understanding of the relationship between addition and subtraction facts in a part-whole model.</p>  <p> <math>\square - \square = \square</math>  <math>\square - \square = \square</math>  <math>\square + \square = \square</math>  <math>\square + \square = \square</math> </p>

Year 1

**Concrete**

**Finding the difference**

Arrange two groups so that the difference between the groups can be worked out.

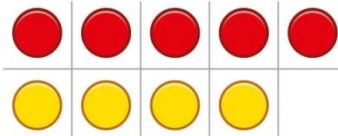


8 is 2 more than 6.  
6 is 2 less than 8.  
The difference between 8 and 6 is 2.

**Pictorial**

**Finding the difference**

Represent objects using sketches or counters to support finding the difference.

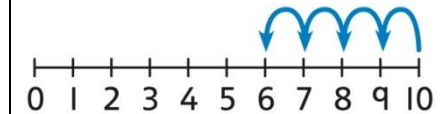


$5 - 4 = 1$   
The difference between 5 and 4 is 1.

**Abstract**

**Finding the difference**

Children understand 'find the difference' as subtraction.



$10 - 4 = 6$   
The difference between 10 and 6 is 4.

**Subtraction within 20**

Understand when and how to subtract 1s efficiently.

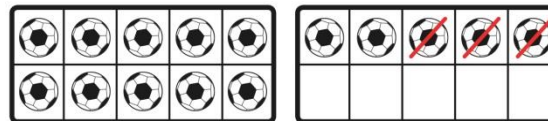
Use a bead string to subtract 1s efficiently.



$5 - 3 = 2$   
 $15 - 3 = 12$

**Subtraction within 20**

Understand when and how to subtract 1s efficiently.



$5 - 3 = 2$   
 $15 - 3 = 12$

**Subtraction within 20**

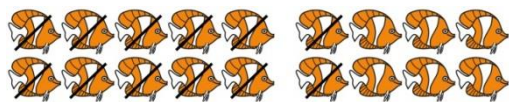
Understand how to use knowledge of bonds within 10 to subtract efficiently.

$5 - 3 = 2$   
 $15 - 3 = 12$

**Subtracting 10s and 1s**

For example:  $18 - 12$

Subtract 12 by first subtracting the 10, then the remaining 2.

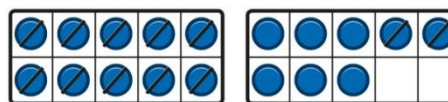


First subtract the 10, then take away 2.

**Subtracting 10s and 1s**

For example:  $18 - 12$

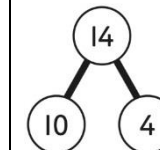
Use ten frames to represent the efficient method of subtracting 12.



First subtract the 10, then subtract 2.

**Subtracting 10s and 1s**

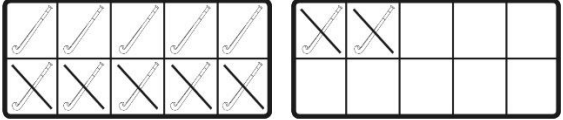
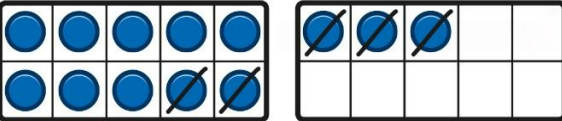
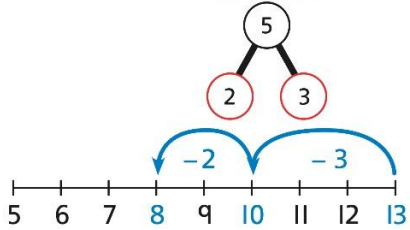




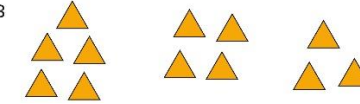

Use a part-whole model to support the calculation.



$19 - 14$   
 $19 - 10 = 9$   
 $9 - 4 = 5$   
So,  $19 - 14 = 5$



Year 1

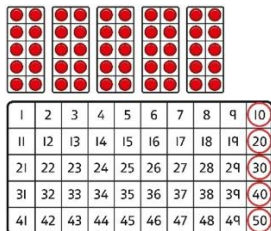
	Concrete	Pictorial	Abstract
	<p><b>Subtraction bridging 10 using number bonds</b> For example: <math>12 - 7</math></p> <p>Arrange objects into a 10 and some 1s, then decide on how to split the 7 into parts.</p>  <p><i>7 is 2 and 5, so I take away the 2 and then the 5.</i></p>	<p><b>Subtraction bridging 10 using number bonds</b> Represent the use of bonds using ten frames.</p>  <p><i>For <math>13 - 5</math>, I take away 3 to make 10, then take away 2 to make 8.</i></p>	<p><b>Subtraction bridging 10 using number bonds</b> Use a number line and a part-whole model to support the method. Add symbols to describe and record addition and subtraction number sentences. Recording by drawing jumps on prepared lines or drawing own number lines.</p> <p><math>13 - 5</math></p> 
Year 1 Multiplication	<p><b>Recognising and making equal groups</b> Children arrange objects in equal and unequal groups and understand how to recognise whether they are equal.</p> <p>A  B  C </p>	<p><b>Recognising and making equal groups</b> Children draw and represent equal and unequal groups.</p> <p>A  B </p>	<p><b>Describe equal groups using words</b></p> <p><i>Three equal groups of 4. Four equal groups of 3.</i></p>
	<p><b>Finding the total of equal groups by counting in 2s, 5s and 10s</b></p> 	<p><b>Finding the total of equal groups by counting in 2s, 5s and 10s</b> 100 squares and ten frames support counting in 2s, 5s and 10s.</p>	<p><b>Finding the total of equal groups by counting in 2s, 5s and 10s</b> Use a number line to support repeated addition through counting in 2s, 5s and 10s.</p>

Year 1

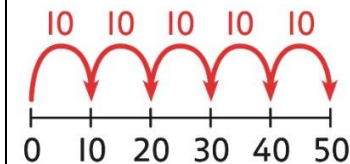
**Concrete**

There are 5 pens in each pack ...  
5...10...15...20...25...30...35...40...

**Pictorial**



**Abstract**



**Year 1 Division**

**Grouping**

Learn to make equal groups from a whole and find how many equal groups of a certain size can be made.

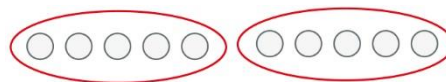
Sort a whole set people and objects into equal groups.



*There are 10 children altogether.  
There are 2 in each group.  
There are 5 groups.*

**Grouping**

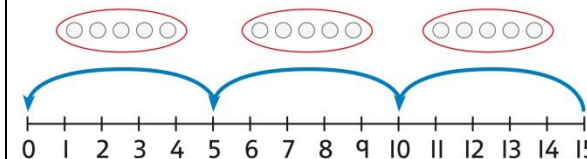
Represent a whole and work out how many equal groups.



*There are 10 in total.  
There are 5 in each group.  
There are 2 groups.*

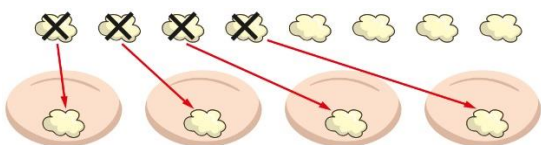
**Grouping**

Children may relate this to counting back in steps of 2, 5 or 10.



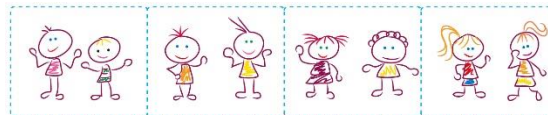
**Sharing**

Share a set of objects into equal parts and work out how many are in each part.



**Sharing**

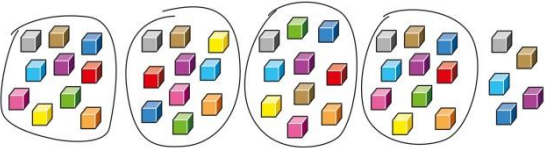
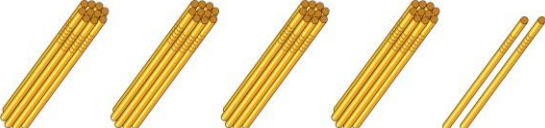
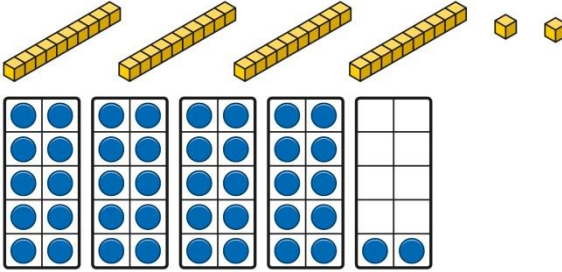
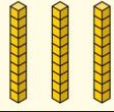

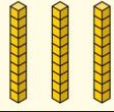

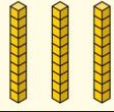


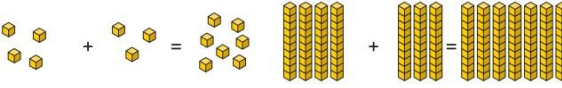
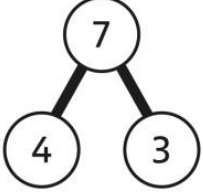
Sketch or draw to represent sharing into equal parts. This may be related to fractions.


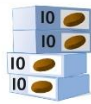


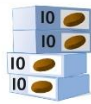



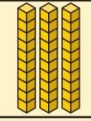
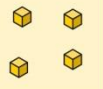
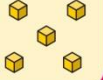
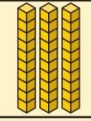
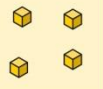
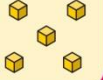
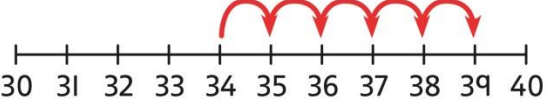
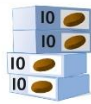


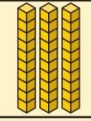
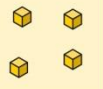
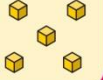

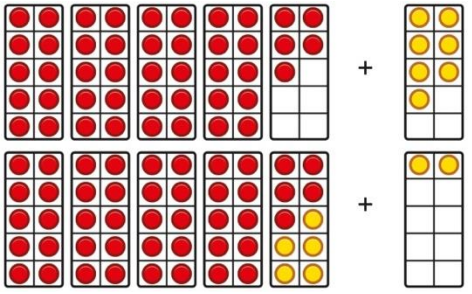
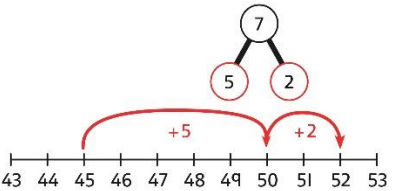


**Sharing**

*10 shared into 2 equal groups gives 5 in each group.*

Year 2

	Concrete	Pictorial	Abstract										
<b>Year 2 Addition</b>													
<b>Understanding 10s and 1s</b>	<p>Group objects into 10s and 1s.</p>  <p>Bundle straws to understand unitising of 10s.</p> 	<p>Understand 10s and 1s equipment, and link with visual representations on ten frames.</p> 	<p>Represent numbers on a place value grid, using equipment or numerals.</p> <table border="1" data-bbox="1579 422 1892 654"> <tr> <th>Tens</th> <th>Ones</th> </tr> <tr> <td></td> <td></td> </tr> <tr> <td>3</td> <td>2</td> </tr> </table> <table border="1" data-bbox="1579 662 1892 750"> <tr> <th>Tens</th> <th>Ones</th> </tr> <tr> <td>4</td> <td>3</td> </tr> </table>	Tens	Ones			3	2	Tens	Ones	4	3
Tens	Ones												
													
3	2												
Tens	Ones												
4	3												
<b>Adding 10s</b>	<p>Use known bonds and unitising to add 10s.</p>  <p><i>I know that 4 + 3 = 7. So, I know that 4 tens add 3 tens is 7 tens.</i></p>	<p>Use known bonds and unitising to add 10s.</p>  <p><i>I know that 4 + 3 = 7. So, I know that 4 tens add 3 tens is 7 tens.</i></p>	<p>Use known bonds and unitising to add 10s.</p>  <p>4 + 3 = <input type="text"/></p> <p><i>4 + 3 = 7 4 tens + 3 tens = 7 tens 40 + 30 = 70</i></p>										
<b>Adding a 1-digit number to a 2-digit</b>	<p>Add the 1s to find the total. Use known bonds within 10.</p>	<p>Add the 1s.</p>	<p>Add the 1s.</p> <p>Understand the link between counting on and using known number facts. Children</p>										

	Concrete	Pictorial	Abstract																				
<p><b>number not bridging a 10</b></p>	 <p>41 is 4 tens and 1 one. 41 add 6 ones is 4 tens and 7 ones.</p> <p>This can also be done in a place value grid.</p> <table border="1" data-bbox="376 571 638 842"> <tr> <td>T</td> <td>O</td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> </table>	T	O					 <p>34 is 3 tens and 4 ones. 4 ones and 5 ones are 9 ones. The total is 3 tens and 9 ones.</p> <table border="1" data-bbox="974 507 1254 794"> <tr> <td>T</td> <td>O</td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> </table>	T	O					<p>should be encouraged to use known number bonds to improve efficiency and accuracy.</p>  <p>This can be represented horizontally or vertically.</p> $34 + 5 = 39$ <p>or</p> <table border="1" data-bbox="1579 678 1747 901"> <tr> <td>T</td> <td>O</td> </tr> <tr> <td>3</td> <td>4</td> </tr> <tr> <td>+</td> <td>5</td> </tr> <tr> <td></td> <td>9</td> </tr> </table>	T	O	3	4	+	5		9
T	O																						
																							
																							
T	O																						
																							
																							
T	O																						
3	4																						
+	5																						
	9																						
<p><b>Adding a 1-digit number to a 2-digit number bridging 10</b></p>	<p>Complete a 10 using number bonds.</p>  <p>There are 4 tens and 5 ones. I need to add 7. I will use 5 to complete a 10, then add 2 more.</p>	<p>Complete a 10 using number bonds.</p> 	<p>Complete a 10 using number bonds.</p>  $7 = 5 + 2$ $45 + 5 + 2 = 52$																				

**Adding a 1-digit number to a 2-digit number using exchange**

**Concrete**  
Exchange 10 ones for 1 ten.

**Pictorial**  
Exchange 10 ones for 1 ten.

**Abstract**  
Exchange 10 ones for 1 ten.

$$\begin{array}{r} \text{T} \quad \text{O} \\ 2 \quad 4 \\ + \quad 8 \\ \hline \quad 2 \\ \hline 1 \end{array}$$
  

$$\begin{array}{r} \text{T} \quad \text{O} \\ 2 \quad 4 \\ \quad 8 \\ \hline 3 \quad 2 \end{array}$$

**Adding a multiple of 10 to a 2-digit number**

Add the 10s and then recombine.

27 is 2 tens and 7 ones.  
50 is 5 tens.

There are 7 tens in total and 7 ones.  
So, 27 + 50 is 7 tens and 7 ones.

Add the 10s and then recombine.

66 is 6 tens and 6 ones.  
66 + 10 = 76

A 100 square can support this understanding.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

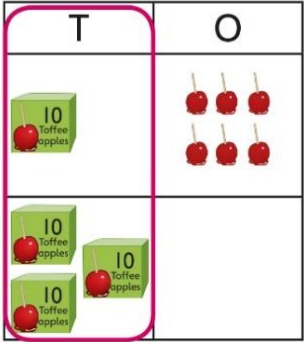
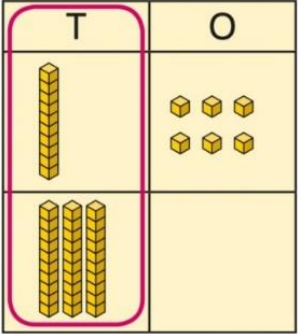
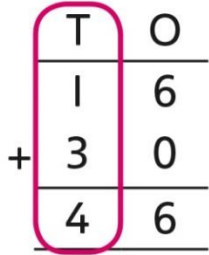
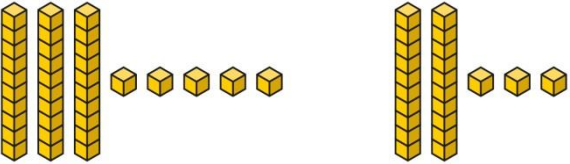
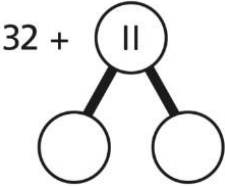
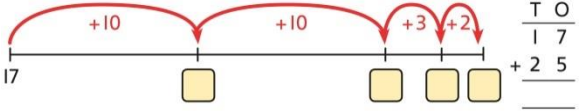
Add the 10s and then recombine.

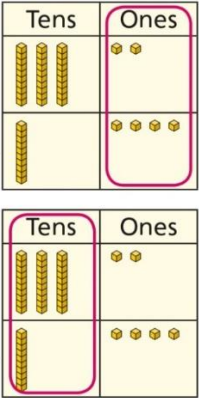
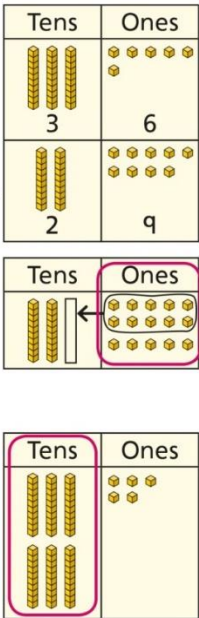
37 + 20 = ?

30 + 20 = 50  
50 + 7 = 57

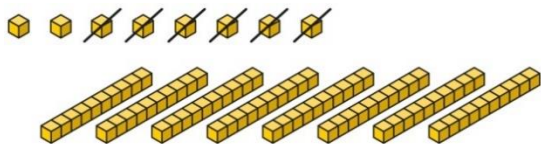
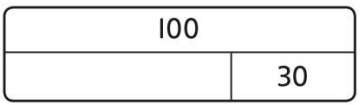
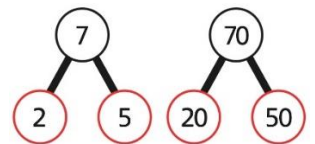
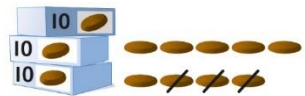
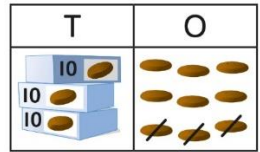
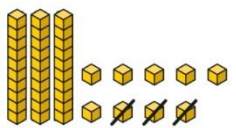
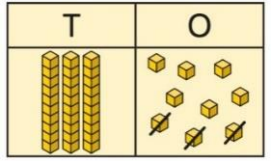
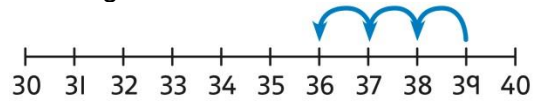
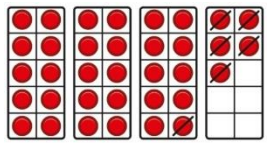
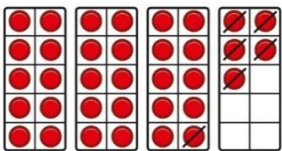
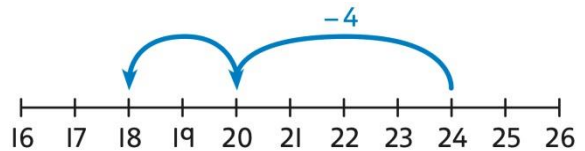
37 + 20 = 57



	Concrete	Pictorial	Abstract
<p><b>Adding a multiple of 10 to a 2-digit number using columns</b></p>	<p>Add the 10s using a place value grid to support.</p>  <p>16 is 1 ten and 6 ones. 30 is 3 tens. There are 4 tens and 6 ones in total.</p>	<p>Add the 10s using a place value grid to support.</p>  <p>16 is 1 ten and 6 ones. 30 is 3 tens. There are 4 tens and 6 ones in total.</p>	<p>Add the 10s represented vertically. Children must understand how the method relates to unitising of 10s and place value.</p>  <p>1 + 3 = 4 1 ten + 3 tens = 4 tens 16 + 30 = 46</p>
<p><b>Adding two 2-digit numbers</b></p>	<p>Add the 10s and 1s separately.</p>  <p>5 + 3 = 8 There are 8 ones in total.</p> <p>3 + 2 = 5 There are 5 tens in total.</p> <p>35 + 23 = 58</p>	<p>Add the 10s and 1s separately. Use a part-whole model to support.</p>  <p>11 = 10 + 1 32 + 10 = 42 42 + 1 = 43</p> <p>32 + 11 = 43</p>	<p>Add the 10s and the 1s separately, bridging 10s where required. A number line can support the calculations.</p>  <p>17 + 25</p>

	Concrete	Pictorial	Abstract
<p><b>Adding two 2-digit numbers using a place value grid</b></p>	<p>Add the 1s. Then add the 10s.</p> 		<p>Add the 1s. Then add the 10s.</p> $\begin{array}{r} \text{T} \text{ O} \\ 32 \\ + 14 \\ \hline 46 \end{array}$
<p><b>Adding two 2-digit numbers with exchange</b></p>	<p>Add the 1s. Exchange 10 ones for a ten. Then add the 10s.</p> 		<p>Add the 1s. Exchange 10 ones for a ten. Then add the 10s.</p> $\begin{array}{r} \text{T} \text{ O} \\ 36 \\ + 29 \\ \hline 65 \end{array}$

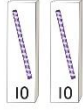



Year 2

	Concrete	Pictorial	Abstract												
<b>Year 2 Subtraction</b>															
<b>Subtracting multiples of 10</b>	<p>Use known number bonds and unitising to subtract multiples of 10.</p>  <p>8 subtract 6 is 2. So, 8 tens subtract 6 tens is 2 tens.</p>	<p>Use known number bonds and unitising to subtract multiples of 10.</p>  <p><math>10 - 3 = 7</math> So, 10 tens subtract 3 tens is 7 tens.</p>	<p>Use known number bonds and unitising to subtract multiples of 10.</p>  <p>7 tens subtract 5 tens is 2 tens. <math>70 - 50 = 20</math></p>												
<b>Subtracting a single-digit number</b>	<p>Subtract the 1s. This may be done in or out of a place value grid.</p>  	<p>Subtract the 1s. This may be done in or out of a place value grid.</p>  	<p>Subtract the 1s. Understand the link between counting back and subtracting the 1s using known bonds.</p>  <table style="margin-left: auto; margin-right: auto;"> <tr><td></td><td>T</td><td>O</td></tr> <tr><td></td><td>3</td><td>9</td></tr> <tr><td>-</td><td></td><td>3</td></tr> <tr><td></td><td>3</td><td>6</td></tr> </table> <p><math>9 - 3 = 6</math> <math>39 - 3 = 36</math></p>		T	O		3	9	-		3		3	6
	T	O													
	3	9													
-		3													
	3	6													
<b>Subtracting a single-digit number bridging 10</b>	<p>Bridge 10 by using known bonds.</p>  <p><math>35 - 6</math> I took away 5 counters, then 1 more.</p>	<p>Bridge 10 by using known bonds.</p>  <p><math>35 - 6</math> First, I will subtract 5, then 1.</p>	<p>Bridge 10 by using known bonds.</p>  <p><math>24 - 6 = ?</math> <math>24 - 4 - 2 = ?</math></p>												

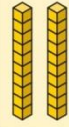





**Subtracting a single-digit number using exchange**

**Concrete**  
Exchange 1 ten for 10 ones. This may be done in or out of a place value grid.

T	O
	
T	O
	

**Pictorial**  
Exchange 1 ten for 10 ones.

T	O
	
T	O
	

**Abstract**  
Exchange 1 ten for 10 ones.

T	O
2	5
-	7
	8

T	O
2	5
-	7
1	8

$25 - 7 = 18$

**Subtracting a 2-digit number**

**Concrete**  
Subtract by taking away.

○	○	○	○	○	○	○	○	○	○
○	○	○	○	○	○	○	○	○	○
○	○	○	○	○	○	○	○	○	○
○	○	○	○	○	○	○	○	○	○
○	○	○	○	○	○	○	○	○	○
○	○	○	○	○	○	○	○	○	○
○	○	○	○	○	○	○	○	○	○
○	○	○	○	○	○	○	○	○	○
○	○	○	○	○	○	○	○	○	○
○	○	○	○	○	○	○	○	○	○

$61 - 18$   
*I took away 1 ten and 8 ones.*

**Pictorial**  
Subtract the 10s and the 1s.  
This can be represented on a 100 square.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

**Abstract**  
Subtract the 10s and the 1s.  
This can be represented on a number line.

23	33	43	53	63	64
----	----	----	----	----	----

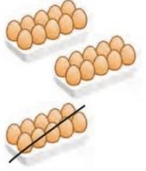
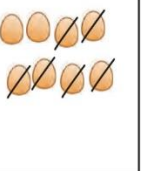
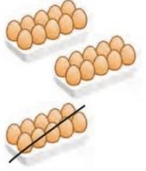
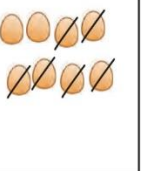
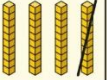

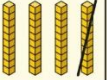

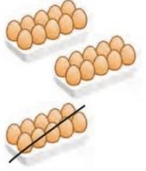
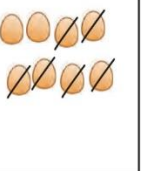
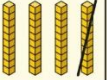

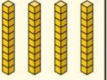



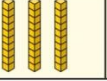



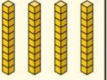



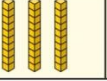



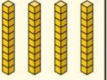



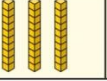



$64 - 41 = ?$

$64 - 1 = 63$   
 $63 - 40 = 23$   
 $64 - 41 = 23$


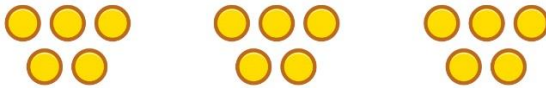
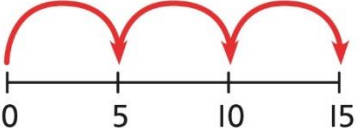

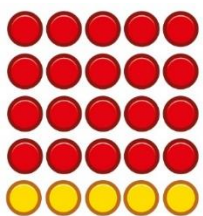
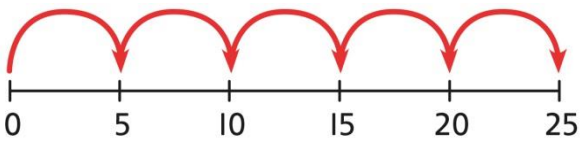

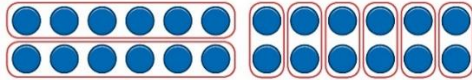

21	26	36	46
----	----	----	----


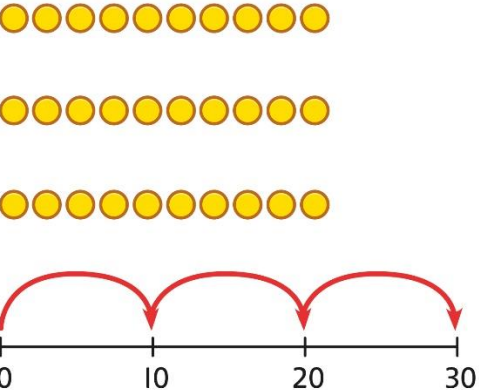
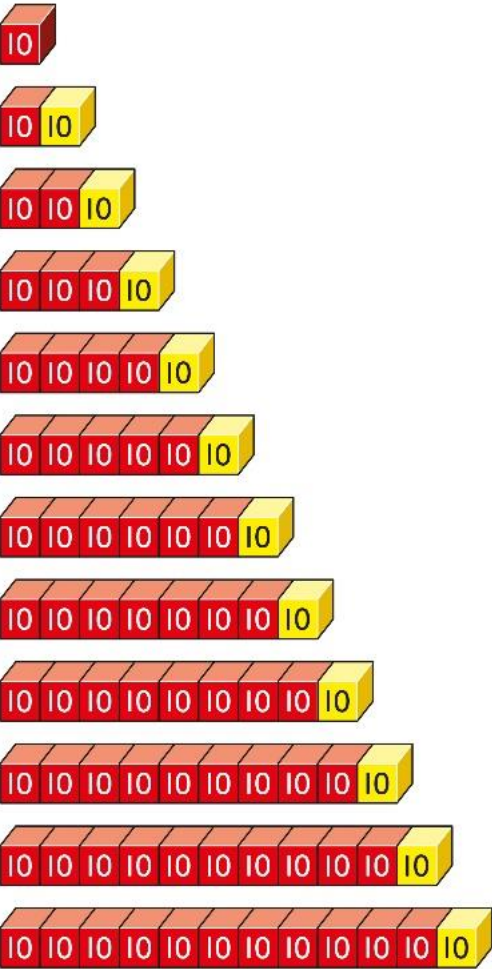
$46 - 20 = 26$   
 $26 - 5 = 21$   
 $46 - 25 = 21$

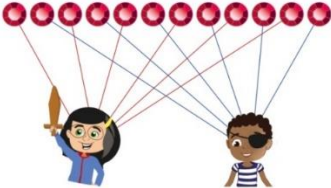
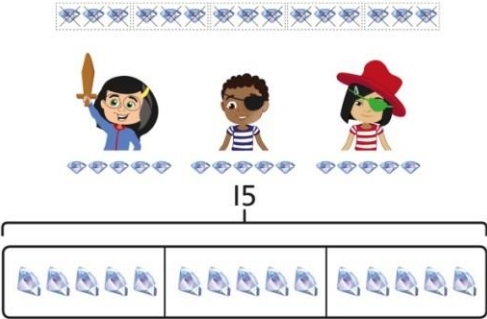

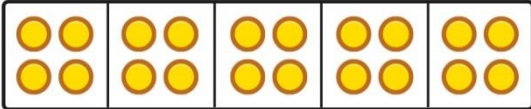
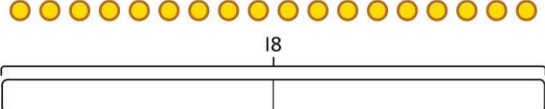
Year 2

	Concrete	Pictorial	Abstract																
<p><b>Subtracting a 2-digit number using place value and columns</b></p>	<p>Subtract the 1s. Then subtract the 10s. This may be done in or out of a place value grid.</p> <table border="1" data-bbox="383 339 696 571"> <thead> <tr> <th>T</th> <th>O</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table> <p><math>38 - 16 = 22</math></p>	T	O			<p>Subtract the 1s. Then subtract the 10s.</p> <table border="1" data-bbox="981 304 1205 435"> <thead> <tr> <th>Tens</th> <th>Ones</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table>	Tens	Ones			<p>Using column subtraction, subtract the 1s. Then subtract the 10s.</p> $\begin{array}{r} \text{T} \quad \text{O} \\ 4 \quad 5 \\ - 1 \quad 2 \\ \hline 3 \quad 3 \end{array}$ $\begin{array}{r} \text{T} \quad \text{O} \\ 4 \quad 5 \\ - 1 \quad 2 \\ \hline 3 \quad 3 \end{array}$								
T	O																		
																			
Tens	Ones																		
																			
<p><b>Subtracting a 2-digit number with exchange</b></p>		<p>Exchange 1 ten for 10 ones. Then subtract the 1s. Then subtract the 10s.</p> <table border="1" data-bbox="981 839 1205 970"> <thead> <tr> <th>Tens</th> <th>Ones</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table> <table border="1" data-bbox="981 1007 1205 1137"> <thead> <tr> <th>Tens</th> <th>Ones</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table> <table border="1" data-bbox="981 1174 1205 1305"> <thead> <tr> <th>Tens</th> <th>Ones</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table> <table border="1" data-bbox="981 1342 1205 1473"> <thead> <tr> <th>Tens</th> <th>Ones</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table>	Tens	Ones			Tens	Ones			Tens	Ones			Tens	Ones			<p>Using column subtraction, exchange 1 ten for 10 ones. Then subtract the 1s. Then subtract the 10s.</p> $\begin{array}{r} \text{T} \quad \text{O} \\ 4 \quad 5 \\ - 2 \quad 7 \\ \hline \end{array}$ $\begin{array}{r} \text{T} \quad \text{O} \\ \cancel{3} \quad 15 \\ - 2 \quad 7 \\ \hline 8 \end{array}$ $\begin{array}{r} \text{T} \quad \text{O} \\ \cancel{3} \quad 15 \\ - 2 \quad 7 \\ \hline 1 \quad 8 \end{array}$
Tens	Ones																		
																			
Tens	Ones																		
																			
Tens	Ones																		
																			
Tens	Ones																		
																			







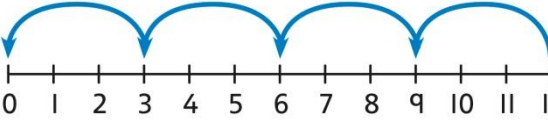
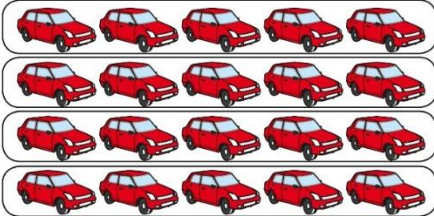
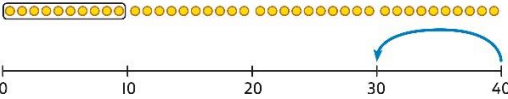
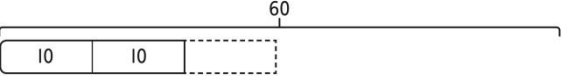
Year 2

	Concrete	Pictorial	Abstract
<b>Year 2 Multiplication</b>			
<b>Equal groups and repeated addition</b>	<p>Recognise equal groups and write as repeated addition and as multiplication.</p>  <p><i>3 groups of 5 chairs 15 chairs altogether</i></p>	<p>Recognise equal groups using standard objects such as counters and write as repeated addition and multiplication.</p>  <p><i>3 groups of 5 15 in total</i></p>	<p>Use a number line and write as repeated addition and as multiplication.</p>  <p><math>5 + 5 + 5 = 15</math> <math>3 \times 5 = 15</math></p>
<b>Using arrays to represent multiplication and support understanding</b>	<p>Understand the relationship between arrays, multiplication and repeated addition.</p>  <p><i>4 groups of 5</i></p>	<p>Understand the relationship between arrays, multiplication and repeated addition.</p>  <p><i>4 groups of 5 ... 5 groups of 5</i></p>	<p>Understand the relationship between arrays, multiplication and repeated addition.</p>  <p><math>5 \times 5 = 25</math></p>
<b>Understanding commutativity</b>	<p>Use arrays to visualise commutativity.</p>  <p><i>I can see 6 groups of 3. I can see 3 groups of 6.</i></p>	<p>Form arrays using counters to visualise commutativity. Rotate the array to show that orientation does not change the multiplication.</p>  <p><i>This is 2 groups of 6 and also 6 groups of 2.</i></p>	<p>Use arrays to visualise commutativity.</p>  <p><math>4 + 4 + 4 + 4 + 4 = 20</math> <math>5 + 5 + 5 + 5 = 20</math> <math>4 \times 5 = 20</math> and <math>5 \times 4 = 20</math></p>

	Concrete	Pictorial	Abstract
<p><b>Learning <math>\times 2</math>, <math>\times 5</math> and <math>\times 10</math> table facts</b></p>	<p>Develop an understanding of how to unitise groups of 2, 5 and 10 and learn corresponding times-table facts.</p>  <p>3 groups of 10 ... 10, 20, 30 <math>3 \times 10 = 30</math></p>	<p>Understand how to relate counting in unitised groups and repeated addition with knowing key times-table facts.</p>  <p><math>10 + 10 + 10 = 30</math> <math>3 \times 10 = 30</math></p>	<p>Understand how the times-tables increase and contain patterns.</p>  <p><math>5 \times 10 = 50</math> <math>6 \times 10 = 60</math></p>

	Concrete	Pictorial	Abstract
<b>Year 2 Division</b>			
<b>Sharing equally</b>	<p>Start with a whole and share into equal parts, one at a time.</p>  <p>12 shared equally between 2. They get 6 each.</p> <p>Start to understand how this also relates to grouping. To share equally between 3 people, take a group of 3 and give 1 to each person. Keep going until all the objects have been shared</p>  <p>They get 5  each.</p> <p>15 shared equally between 3. They get 5 each.</p>	<p>Represent the objects shared into equal parts using a bar model.</p>  <p>20 shared into 5 equal parts. There are 4 in each part.</p>	<p>Use a bar model to support understanding of the division.</p>  <p>18 ÷ 2 = 9</p>



	Concrete	Pictorial	Abstract
<p><b>Grouping equally</b></p>	<p>Understand how to make equal groups from a whole.</p>  <p>8 divided into 4 equal groups. There are 2 in each group.</p>	<p>Understand the relationship between grouping and the division statements.</p> <p><math>12 \div 3 = 4</math></p>  <p><math>12 \div 4 = 3</math></p>  <p><math>12 \div 6 = 2</math></p>  <p><math>12 \div 2 = 6</math></p> 	<p>Understand how to relate division by grouping to repeated subtraction.</p>   <p>There are 4 groups now.</p> <p>12 divided into groups of 3. <math>12 \div 3 = 4</math></p> <p>There are 4 groups.</p>
<p><b>Using known times-tables to solve divisions</b></p>	<p>Understand the relationship between multiplication facts and division.</p>  <p>4 groups of 5 cars is 20 cars in total. 20 divided by 4 is 5.</p>	<p>Link equal grouping with repeated subtraction and known times-table facts to support division.</p>  <p>40 divided by 4 is 10.</p> <p>Use a bar model to support understanding of the link between times-table knowledge and division.</p> 	<p>Relate times-table knowledge directly to division.</p> <p> <math>1 \times 10 = 10</math>  <math>2 \times 10 = 20</math>  <math>3 \times 10 = 30</math>  <math>4 \times 10 = 40</math>  <math>5 \times 10 = 50</math>  <math>6 \times 10 = 60</math>  <math>7 \times 10 = 70</math>  <math>8 \times 10 = 80</math> </p> <div style="border: 1px solid orange; border-radius: 15px; padding: 10px; display: inline-block;"> <p>I used the 10 times-table to help me. <math>3 \times 10 = 30</math>.</p> </div> <p>I know that 3 groups of 10 makes 30, so I know that 30 divided by 10 is 3.</p> <p><math>3 \times 10 = 30</math> so <math>30 \div 10 = 3</math></p>

## LOWER KEY STAGE 2

In Years 3 and 4, children develop the basis of written methods by building their skills alongside a deep understanding of place value. They should use known addition/subtraction and multiplication/division facts to calculate efficiently and accurately, rather than relying on counting. Children use place value equipment to support their understanding, but not as a substitute for thinking.

**Key language:** partition, place value, tens, hundreds, thousands, column method, whole, part, equal groups, sharing, grouping, bar model

**Addition and subtraction:** In Year 3 especially, the column methods are built up gradually. Children will develop their understanding of how each stage of the calculation, including any exchanges, relates to place value. The example calculations chosen to introduce the stages of each method may often be more suited to a mental method. However, the examples and the progression of the steps have been chosen to help children develop their fluency in the process, alongside a deep understanding of the concepts and the numbers involved, so that they can apply these skills accurately and efficiently to later calculations. The class should be encouraged to compare mental and written methods for specific calculations, and children should be encouraged at every stage to make choices about which methods to apply.

In Year 4, the steps are shown without such fine detail, although children should continue to build their understanding with a secure basis in place value. In subtraction, children will need to develop their understanding of exchange as they may need to exchange across one or two columns.

By the end of Year 4, children should have developed fluency in column methods alongside a deep understanding, which will allow them to progress confidently in upper Key Stage 2.

**Multiplication and division:** Children build a solid grounding in times-tables, understanding the multiplication and division facts in tandem. As such, they should be as confident knowing that 35 divided by 7 is 5 as knowing that 5 times 7 is 35.

Children develop key skills to support multiplication methods: unitising, commutativity, and how to use partitioning effectively.

Unitising allows children to use known facts to multiply and divide multiples of 10 and 100 efficiently. Commutativity gives children flexibility in applying known facts to calculations and problem solving. An understanding of partitioning allows children to extend their skills to multiplying and dividing 2- and 3-digit numbers by a single digit.

Children develop column methods to support multiplications in these cases.

For successful division, children will need to make choices about how to partition. For example, to divide 423 by 3, it is effective to partition 423 into 300, 120 and 3, as these can be divided by 3 using known facts.

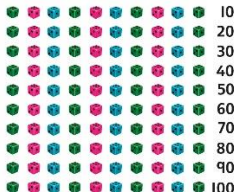
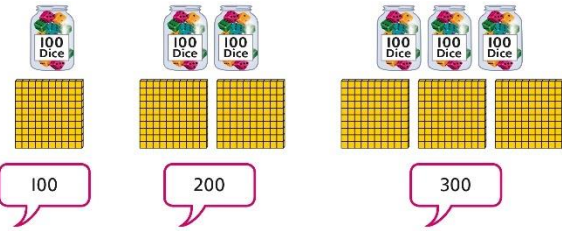


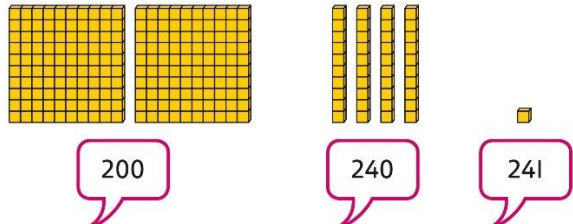
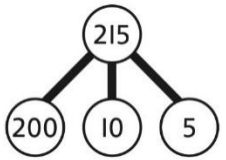
Children will also need to understand the concept of remainder, in terms of a given calculation and in terms of the context of the problem.

**Fractions:** Children develop the key concept of equivalent fractions, and link this with multiplying and dividing the numerators and denominators, as well as exploring the visual concept through fractions of shapes. Children learn how to find a fraction of an amount, and develop this with the aid of a bar model and other representations alongside.

In Year 3, children develop an understanding of how to add and subtract fractions with the same denominator and find complements to the whole. This is developed alongside an understanding of fractions as numbers, including fractions greater than 1. In Year 4, children begin to work with fractions greater than 1.

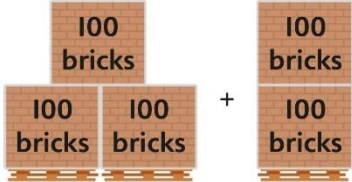
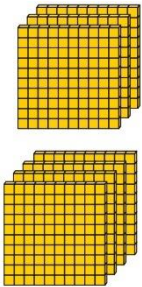
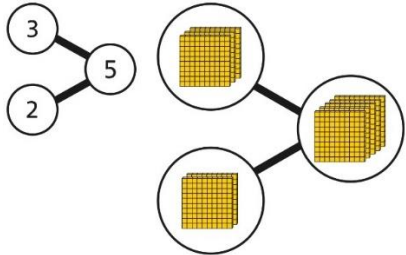









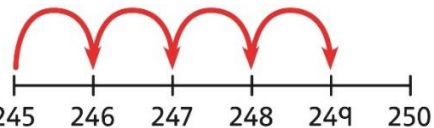




Decimals are introduced, as tenths in Year 3 and then as hundredths in Year 4. Children develop an understanding of decimals in terms of the relationship with fractions, with dividing by 10 and 100, and also with place value.

Year 3

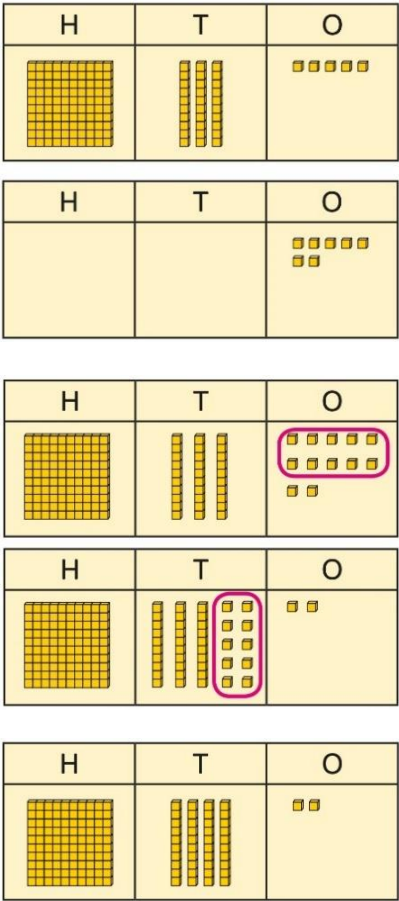
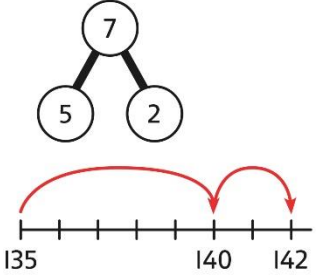
	Concrete	Pictorial	Abstract
<b>Year 3 Addition</b>			
<b>Understanding 100s</b>	<p>Understand the cardinality of 100, and the link with 10 tens.</p> <p>Use cubes to place into groups of 10 tens.</p> 	<p>Unitise 100 and count in steps of 100.</p> 	<p>Represent steps of 100 on a number line and a number track and count up to 1,000 and back to 0.</p> 
<b>Understanding place value to 1,000</b>	<p>Unitise 100s, 10s and 1s to build 3-digit numbers.</p> 	<p>Use equipment to represent numbers to 1,000.</p>  <p>Use a place value grid to support the structure of numbers to 1,000.</p> <p>Place value counters are used alongside other equipment. Children should understand how each counter represents a different unitised amount.</p>	<p>Represent the parts of numbers to 1,000 using a part-whole model.</p>  <p><math>215 = 200 + 10 + 5</math></p> <p>Recognise numbers to 1,000 represented on a number line, including those between intervals.</p>




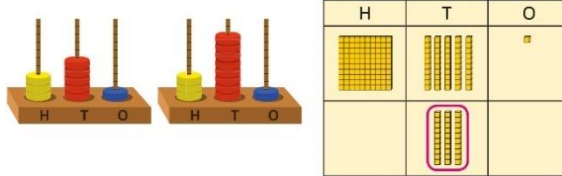
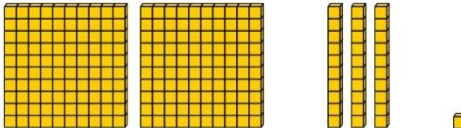
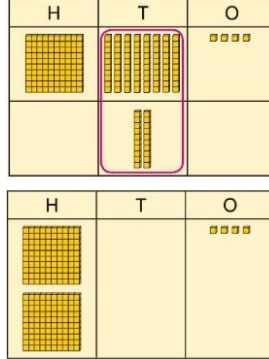
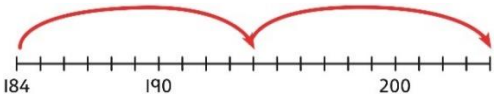
Year 3

	Concrete	Pictorial	Abstract												
<b>Adding 100s</b>	<p>Use known facts and unitising to add multiples of 100.</p>  <p><math>3 + 2 = 5</math>  <math>3 \text{ hundreds} + 2 \text{ hundreds} = 5 \text{ hundreds}</math>  <math>300 + 200 = 500</math></p>	<p>Use known facts and unitising to add multiples of 100.</p>  <p><math>3 + 4 = 7</math>  <math>3 \text{ hundreds} + 4 \text{ hundreds} = 7 \text{ hundreds}</math>  <math>300 + 400 = 700</math></p>	<p>Use known facts and unitising to add multiples of 100.</p> <p>Represent the addition on a number line.</p> <p>Use a part-whole model to support unitising.</p>  <p><math>3 + 2 = 5</math>  <math>300 + 200 = 500</math></p>												
<b>3-digit number + 1s, no exchange or bridging</b>	<p>Use number bonds to add the 1s.</p>  <p><math>214 + 4 = ?</math></p> <p>Now there are <math>4 + 4</math> ones in total.  <math>4 + 4 = 8</math></p> <p><math>214 + 4 = 218</math></p>	<p>Use number bonds to add the 1s.</p> <table border="1" data-bbox="958 911 1261 1155"> <thead> <tr> <th>H</th> <th>T</th> <th>O</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>4</td> <td>9</td> </tr> </tbody> </table> <p>Use number bonds to add the 1s.  <math>5 + 4 = 9</math></p> <p><math>245 + 4</math>  <math>5 + 4 = 9</math></p> <p><math>245 + 4 = 249</math></p>	H	T	O							2	4	9	<p>Understand the link with counting on.</p> <p><math>245 + 4</math></p>  <p>Use number bonds to add the 1s and understand that this is more efficient and less prone to error.</p> <p><math>245 + 4 = ?</math></p> <p>I will add the 1s.  <math>5 + 4 = 9</math>          So, <math>245 + 4 = 249</math></p>
H	T	O													
															
															
2	4	9													

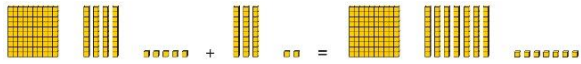
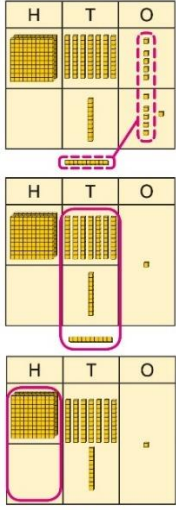
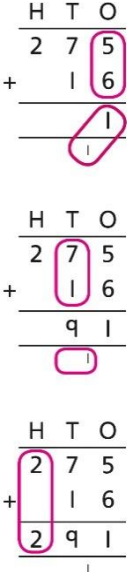
Year 3

	Concrete	Pictorial	Abstract
<p><b>3-digit number + 1s with exchange</b></p>	<p>Understand that when the 1s sum to 10 or more, this requires an exchange of 10 ones for 1 ten.</p> <p>Children should explore this using unitised objects or physical apparatus.</p>	<p>Exchange 10 ones for 1 ten where needed. Use a place value grid to support the understanding.</p>  <p><math>135 + 7 = 142</math></p>	<p>Understand how to bridge by partitioning to the 1s to make the next 10.</p>  <p><math>135 + 7 = ?</math>  <math>135 + 5 + 2 = 142</math></p> <p>Ensure that children understand how to add 1s bridging a 100.</p> <p><math>198 + 5 = ?</math>  <math>198 + 2 + 3 = 203</math></p>

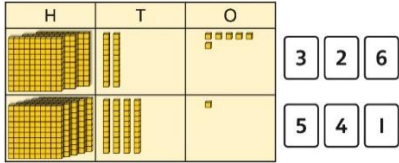
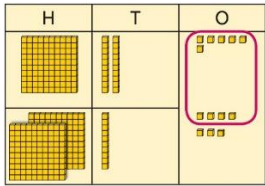
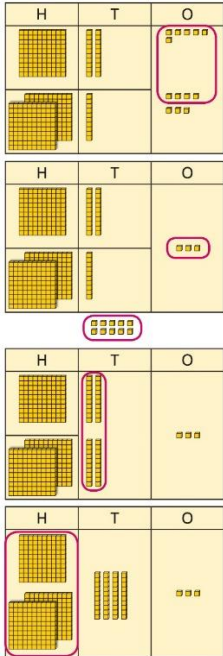
Year 3

	Concrete	Pictorial	Abstract
<p><b>3-digit number + 10s, no exchange</b></p>	<p>Calculate mentally by forming the number bond for the 10s.</p>  <p><math>234 + 50</math>  <i>There are 3 tens and 5 tens altogether.</i>  <math>3 + 5 = 8</math>  <i>In total there are 8 tens.</i>  <math>234 + 50 = 284</math></p>	<p>Calculate mentally by forming the number bond for the 10s.</p> <p><math>351 + 30 = ?</math></p>  <p><math>5 \text{ tens} + 3 \text{ tens} = 8 \text{ tens}</math>  <math>351 + 30 = 381</math></p>	<p>Calculate mentally by forming the number bond for the 10s.</p> <p><math>753 + 40</math></p> <p><i>I know that <math>5 + 4 = 9</math></i></p> <p>So, <math>50 + 40 = 90</math>  <math>753 + 40 = 793</math></p>
<p><b>3-digit number + 10s, with exchange</b></p>	<p>Understand the exchange of 10 tens for 1 hundred.</p> 	<p>Add by exchanging 10 tens for 1 hundred.</p> <p><math>184 + 20 = ?</math></p>  <p><math>184 + 20 = 204</math></p>	<p>Understand how the addition relates to counting on in 10s across 100.</p>  <p><math>184 + 20 = ?</math></p> <p><i>I can count in 10s ... 194 ... 204</i>  <math>184 + 20 = 204</math></p> <p>Use number bonds within 20 to support efficient mental calculations.</p> <p><math>385 + 50</math>  <i>There are 8 tens and 5 tens.</i>  <i>That is 13 tens.</i>  <math>385 + 50 = 300 + 130 + 5</math>  <math>385 + 50 = 435</math></p>

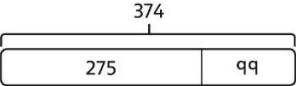
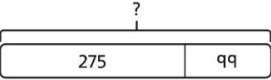
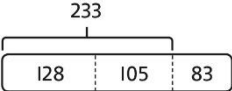
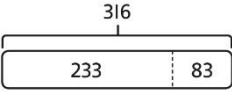
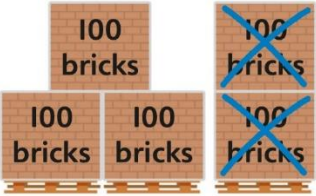
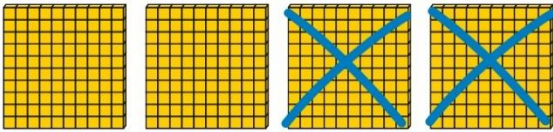
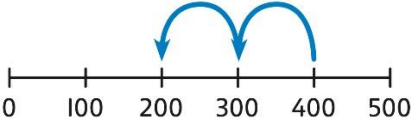
Year 3



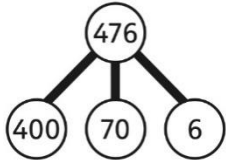
	Concrete	Pictorial	Abstract
<p><b>3-digit number + 2-digit number</b></p>	<p>Use place value equipment to make and combine groups to model addition.</p> 	<p>Use a place value grid to organise thinking and adding of 1s, then 10s.</p>	<p>Use the vertical column method to represent the addition. Children must understand how this relates to place value at each stage of the calculation.</p>
<p><b>3-digit number + 2-digit number, exchange required</b></p>	<p>Use place value equipment to model addition and understand where exchange is required.</p> <p><i>Use place value counters to represent 154 + 72.</i></p> <p><i>Use this to decide if any exchange is required.</i></p> <p><i>There are 5 tens and 7 tens. That is 12 tens so 1 will exchange.</i></p>	<p>Represent the required exchange on a place value grid using equipment.</p> <p><math>275 + 16 = ?</math></p>  <p><math>275 + 16 = 291</math></p> <p>Note: In this example, a mental method may be more efficient. The numbers for the example calculation have been chosen to allow children to visualise the concept and see how the method relates to place value. Children should be encouraged at every stage to select methods that are accurate and efficient.</p>	<p>Use a column method with exchange. Children must understand how the method relates to place value at each stage of the calculation.</p> $\begin{array}{r} \text{H T O} \\ 275 \\ + 16 \\ \hline \end{array}$  <p><math>275 + 16 = 291</math></p>

Year 3

	Concrete	Pictorial	Abstract
<p><b>3-digit number + 3-digit number, no exchange</b></p>	<p>Use place value equipment to make a representation of a calculation. This may or may not be structured in a place value grid.</p> <p><i>326 + 541 is represented as:</i></p> 	<p>Represent the place value grid with equipment to model the stages of column addition.</p>	<p>Use a column method to solve efficiently, using known bonds. Children must understand how this relates to place value at every stage of the calculation.</p>
<p><b>3-digit number + 3-digit number, exchange required</b></p>	<p>Use place value equipment to enact the exchange required.</p>  <p><i>There are 13 ones. I will exchange 10 ones for 1 ten.</i></p>	<p>Model the stages of column addition using place value equipment on a place value grid.</p> 	<p>Use column addition, ensuring understanding of place value at every stage of the calculation.</p> $\begin{array}{r} \text{H T O} \\ 126 \\ + 217 \\ \hline 343 \end{array}$ $\begin{array}{r} \text{H T O} \\ 126 \\ + 217 \\ \hline 43 \end{array}$ $\begin{array}{r} \text{H T O} \\ 126 \\ + 217 \\ \hline 343 \end{array}$ <p><math>126 + 217 = 343</math> Note: Children should also study examples where exchange is required in more than one column, for example <math>185 + 318 = ?</math></p>

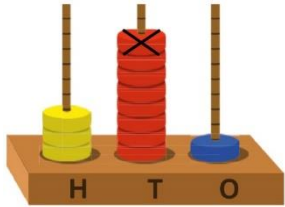
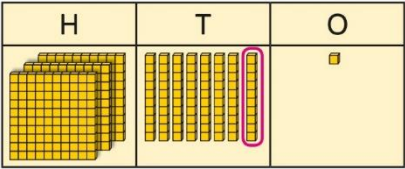
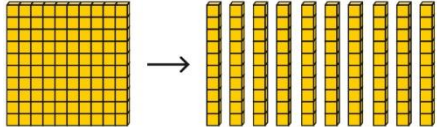
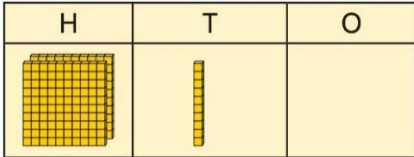
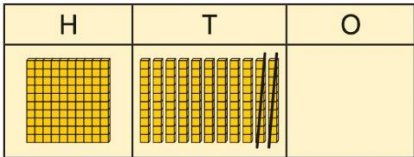
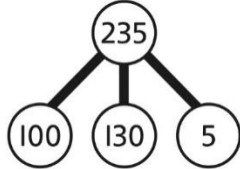
Year 3

	Concrete	Pictorial	Abstract
<p><b>Representing addition problems, and selecting appropriate methods</b></p>	<p>Encourage children to use their own drawings and choices of place value equipment to represent problems with one or more steps.</p> <p>These representations will help them to select appropriate methods.</p>	<p>Children understand and create bar models to represent addition problems.</p> <p><math>275 + 99 = ?</math></p>  <p><math>275 + 99 = 374</math></p>	<p>Use representations to support choices of appropriate methods.</p>  <p><i>I will add 100, then subtract 1 to find the solution.</i></p> <p><math>128 + 105 + 83 = ?</math> <i>I need to add three numbers.</i></p> <p><math>128 + 105 = 233</math></p>  
<p><b>Year 3 Subtraction</b></p>			
<p><b>Subtracting 100s</b></p>	<p>Use known facts and unitising to subtract multiples of 100.</p>  <p><math>5 - 2 = 3</math> <math>500 - 200 = 300</math></p>	<p>Use known facts and unitising to subtract multiples of 100.</p>  <p><math>4 - 2 = 2</math> <math>400 - 200 = 200</math></p>	<p>Understand the link with counting back in 100s.</p>  <p><math>400 - 200 = 200</math></p> <p>Use known facts and unitising as efficient and accurate methods. <i>I know that <math>7 - 4 = 3</math>. Therefore, I know that <math>700 - 400 = 300</math>.</i></p>

	Concrete	Pictorial	Abstract																		
<p><b>3-digit number – 1s, no exchange</b></p>	<p>Use number bonds to subtract the 1s.</p>  <p>214 - 3 = ?</p>  <p>4 - 3 = 1 214 - 3 = 211</p>	<p>Use number bonds to subtract the 1s.</p> <table border="1" data-bbox="958 300 1265 478"> <tr> <th>H</th> <th>T</th> <th>O</th> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>1</td> <td>9</td> </tr> </table> <p>319 - 4 = ?</p> <table border="1" data-bbox="958 582 1265 761"> <tr> <th>H</th> <th>T</th> <th>O</th> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>1</td> <td>9</td> </tr> </table> <p>9 - 4 = 5 319 - 4 = 315</p>	H	T	O				3	1	9	H	T	O				3	1	9	<p>Understand the link with counting back using a number line.</p> <p>Use known number bonds to calculate mentally.</p> <p>476 - 4 = ?</p>  <p>6 - 4 = 2 476 - 4 = 472</p>
H	T	O																			
3	1	9																			
H	T	O																			
3	1	9																			
<p><b>3-digit number – 1s, exchange or bridging required</b></p>	<p>Understand why an exchange is necessary by exploring why 1 ten must be exchanged.</p> <p>Use place value equipment.</p>	<p>Represent the required exchange on a place value grid.</p> <p>151 - 6 = ?</p> <table border="1" data-bbox="967 1093 1332 1240"> <tr> <th>H</th> <th>T</th> <th>O</th> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table> <table border="1" data-bbox="967 1252 1332 1399"> <tr> <th>H</th> <th>T</th> <th>O</th> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>	H	T	O				H	T	O				<p>Calculate mentally by using known bonds.</p> <p>151 - 6 = ?</p> <p>151 - 1 - 5 = 145</p>						
H	T	O																			
H	T	O																			

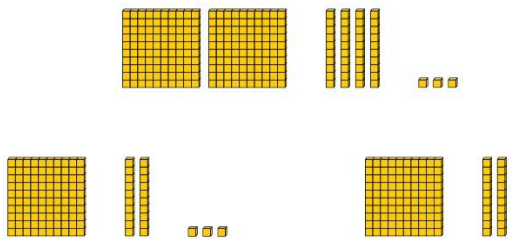
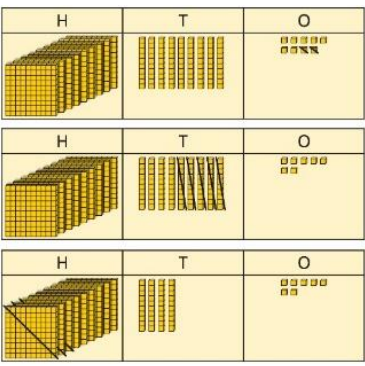
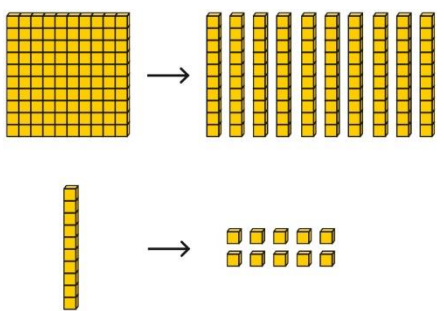
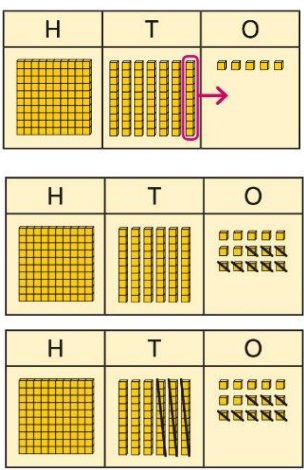
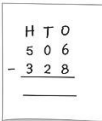


Year 3

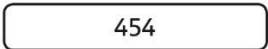
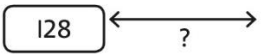
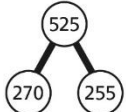
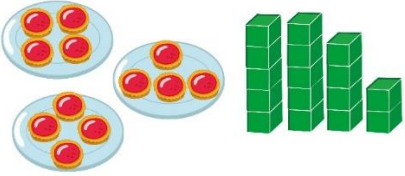
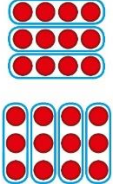
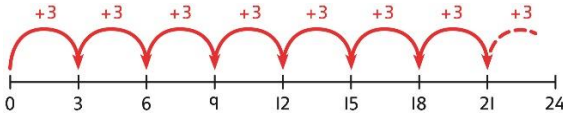
	Concrete	Pictorial	Abstract
<p><b>3-digit number - 10s, no exchange</b></p>	<p>Subtract the 10s using known bonds.</p>  <p><math>381 - 10 = ?</math></p> <p><i>8 tens with 1 removed is 7 tens.</i></p> <p><math>381 - 10 = 371</math></p>	<p>Subtract the 10s using known bonds.</p>  <p><math>8 \text{ tens} - 1 \text{ ten} = 7 \text{ tens}</math></p> <p><math>381 - 10 = 371</math></p>	<p>Use known bonds to subtract the 10s mentally.</p> <p><math>372 - 50 = ?</math></p> <p><math>70 - 50 = 20</math></p> <p>So, <math>372 - 50 = 322</math></p>
<p><b>3-digit number - 10s, exchange or bridging required</b></p>	<p>Use equipment to understand the exchange of 1 hundred for 10 tens.</p> 	<p>Represent the exchange on a place value grid using equipment.</p> <p><math>210 - 20 = ?</math></p>  <p><i>I need to exchange 1 hundred for 10 tens, to help subtract 2 tens.</i></p>  <p><math>210 - 20 = 190</math></p>	<p>Understand the link with counting back on a number line.</p> <p>Use flexible partitioning to support the calculation.</p> <p><math>235 - 60 = ?</math></p>  <p><math>235 = 100 + 130 + 5</math></p> <p><math>235 - 60 = 100 + 70 + 5</math></p> <p><math>= 175</math></p>


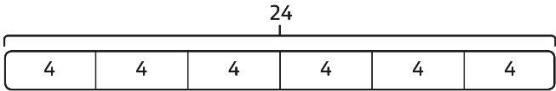

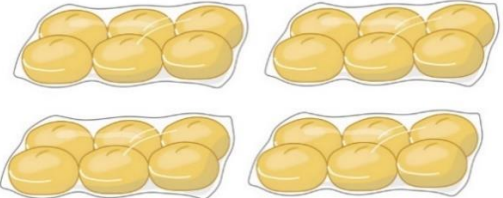
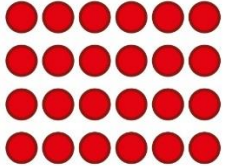


Year 3


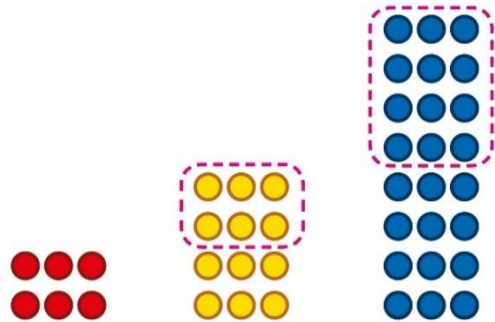
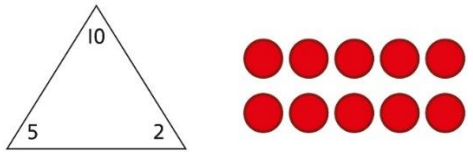

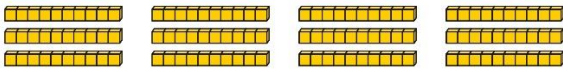
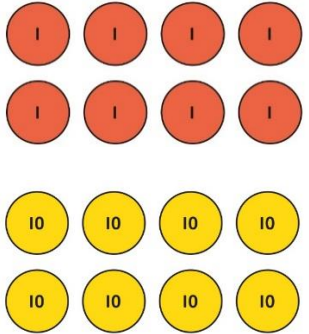
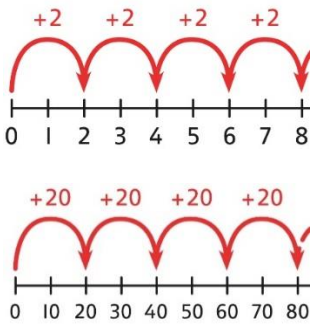
	Concrete	Pictorial	Abstract
<p><b>3-digit number – up to 3-digit number</b></p>	<p>Use place value equipment to explore the effect of splitting a whole into two parts, and understand the link with taking away.</p> 	<p>Represent the calculation on a place value grid.</p> 	<p>Use column subtraction to calculate accurately and efficiently.</p> $\begin{array}{r} \text{H T O} \\ 999 \\ - 352 \\ \hline 7 \end{array}$ $\begin{array}{r} \text{H T O} \\ 999 \\ - 352 \\ \hline 47 \end{array}$ $\begin{array}{r} \text{H T O} \\ 999 \\ - 352 \\ \hline 647 \end{array}$
<p><b>3-digit number – up to 3-digit number, exchange required</b></p>	<p>Use equipment to enact the exchange of 1 hundred for 10 tens, and 1 ten for 10 ones.</p> 	<p>Model the required exchange on a place value grid.</p> <p><math>175 - 38 = ?</math>  <i>I need to subtract 8 ones, so I will exchange a ten for 10 ones.</i></p> 	<p>Use column subtraction to work accurately and efficiently.</p> $\begin{array}{r} \text{H T O} \\ 175 \\ - 38 \\ \hline 137 \end{array}$ <p><math>175 - 38 = 137</math></p> <p>If the subtraction is a 3-digit number subtract a 2-digit number, children should understand how the recording relates to the place value, and so how to line up the digits correctly. Children should also understand how to exchange in calculations where there is a zero in the 10s column.</p> 

Year 3

	Concrete	Pictorial	Abstract																				
<p><b>Representing subtraction problems</b></p>		<p>Use bar models to represent subtractions.</p> <p>'Find the difference' is represented as two bars for comparison.</p> <p>Team A </p> <p>Team B </p> <p>Bar models can also be used to show that a part must be taken away from the whole.</p>	<p>Children use alternative representations to check calculations and choose efficient methods.</p> <p>Children use inverse operations to check additions and subtractions. The part-whole model supports understanding.</p> <p><i>I have completed this subtraction.</i>  <math>525 - 270 = 255</math>  <i>I will check using addition.</i></p>  <table border="0" data-bbox="1556 821 1680 957"> <tr><td></td><td>H</td><td>T</td><td>O</td></tr> <tr><td></td><td>2</td><td>7</td><td>0</td></tr> <tr><td>+</td><td>2</td><td>5</td><td>5</td></tr> <tr><td></td><td>5</td><td>2</td><td>5</td></tr> <tr><td></td><td></td><td></td><td>1</td></tr> </table>		H	T	O		2	7	0	+	2	5	5		5	2	5				1
	H	T	O																				
	2	7	0																				
+	2	5	5																				
	5	2	5																				
			1																				
<p><b>Year 3 Multiplication</b></p>																							
<p><b>Understanding equal grouping and repeated addition</b></p>	<p>Children continue to build understanding of equal groups and the relationship with repeated addition. They recognise both examples and non-examples using objects.</p> 	<p>Children recognise that arrays demonstrate commutativity.</p>  <p><i>This is 3 groups of 4.</i>  <i>This is 4 groups of 3.</i></p>	<p>Children understand the link between repeated addition and multiplication.</p>  <p><i>8 groups of 3 is 24.</i></p> <p><math>3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 = 24</math>  <math>8 \times 3 = 24</math></p>																				

	Concrete	Pictorial	Abstract
	<p>Children recognise that arrays can be used to model commutative multiplications.</p>  <p><i>I can see 3 groups of 8. I can see 8 groups of 3.</i></p>		<p>A bar model may represent multiplications as equal groups.</p>  <p><math>6 \times 4 = 24</math></p>
<p><b>Using commutativity to support understanding of the times-tables</b></p>	<p>Understand how to use times-tables facts flexibly.</p>   <p><i>There are 6 groups of 4 pens. There are 4 groups of 6 bread rolls.</i></p> <p><i>I can use <math>6 \times 4 = 24</math> to work out both totals.</i></p>	<p>Understand how times-table facts relate to commutativity.</p>  <p><math>6 \times 4 = 24</math> <math>4 \times 6 = 24</math></p>	<p>Understand how times-table facts relate to commutativity.</p> <p><i>I need to work out 4 groups of 7.</i></p> <p><i>I know that <math>7 \times 4 = 28</math></i></p> <p><i>so, I know that</i></p> <p><i>4 groups of 7 = 28</i> <i>and</i> <i>7 groups of 4 = 28.</i></p>

Year 3

	Concrete	Pictorial	Abstract
<p><b>Understanding and using x3, x2, x4 and x8 tables.</b></p>	<p>Children learn the times-tables as 'groups of', but apply their knowledge of commutativity.</p>  <p><i>I can use the x3 table to work out how many keys.</i>  <i>I can also use the x3 table to work out how many batteries.</i></p>	<p>Children understand how the x2, x4 and x8 tables are related through repeated doubling.</p>  <p><math>3 \times 2 = 6</math>      <math>3 \times 4 = 12</math>      <math>3 \times 8 = 24</math></p>	<p>Children understand the relationship between related multiplication and division facts in known times-tables.</p>  <p><math>2 \times 5 = 10</math>  <math>5 \times 2 = 10</math>  <math>10 \div 5 = 2</math>  <math>10 \div 2 = 5</math></p>
<p><b>Using known facts to multiply 10s, for example <math>3 \times 40</math></b></p>	<p>Explore the relationship between known times-tables and multiples of 10 using place value equipment.</p> <p><i>Make 4 groups of 3 ones.</i></p>  <p><i>Make 4 groups of 3 tens.</i></p>  <p><i>What is the same?</i>  <i>What is different?</i></p>	<p>Understand how unitising 10s supports multiplying by multiples of 10.</p>  <p><i>4 groups of 2 ones is 8 ones.</i>  <i>4 groups of 2 tens is 8 tens.</i></p> <p><math>4 \times 2 = 8</math>  <math>4 \times 20 = 80</math></p>	<p>Understand how to use known times-tables to multiply multiples of 10.</p>  <p><math>4 \times 2 = 8</math>  <math>4 \times 20 = 80</math></p>

**Multiplying a 2-digit number by a 1-digit number**

**Concrete**

Understand how to link partitioning a 2-digit number with multiplying.

*Each person has 23 flowers.*










*Each person has 2 tens and 3 ones.*



*There are 3 groups of 2 tens.*

*There are 3 groups of 3 ones.*

Use place value equipment to model the multiplication context.

	T	O
		
		
		







*There are 3 groups of 3 ones.*

*There are 3 groups of 2 tens.*







**Pictorial**

Use place value to support how partitioning is linked with multiplying by a 2-digit number.

$3 \times 24 = ?$

T	O
	
	
	

$3 \times 4 = 12$

T	O
	
	
	

$3 \times 20 = 60$

$60 + 12 = 72$

$3 \times 24 = 72$

**Abstract**

Use addition to complete multiplications of 2-digit numbers by a 1-digit number.

$4 \times 13 = ?$

$4 \times 3 = 12$

$4 \times 10 = 40$

$12 + 40 = 52$

$4 \times 13 = 52$

**Multiplying a 2-digit number by a 1-digit number, expanded column method**

**Concrete**

Use place value equipment to model how 10 ones are exchanged for a 10 in some multiplications.

$3 \times 24 = ?$

$3 \times 20 = 60$   
 $3 \times 4 = 12$

$3 \times 24 = 60 + 12$   
 $3 \times 24 = 70 + 2$   
 $3 \times 24 = 72$

**Pictorial**

Understand that multiplications may require an exchange of 1s for 10s, and also 10s for 100s.

$4 \times 23 = ?$

$4 \times 23 = 92$

$5 \times 23 = ?$   
 $5 \times 3 = 15$   
 $5 \times 20 = 100$   
 $5 \times 23 = 115$

**Abstract**

Children may write calculations in expanded column form, but must understand the link with place value and exchange.

Children are encouraged to write the expanded parts of the calculation separately.


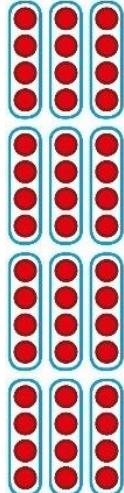
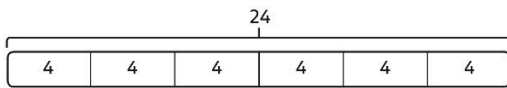
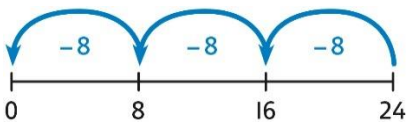
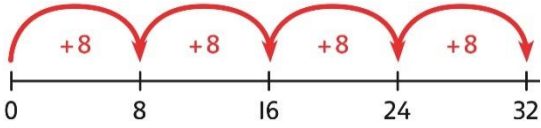
$6 \times 5$   
 $6 \times 10$

$5 \times 28 = ?$

$5 \times 8$   
 $5 \times 20$


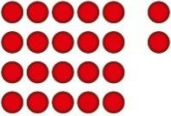
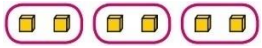
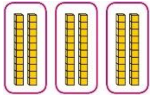
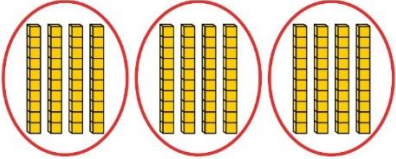
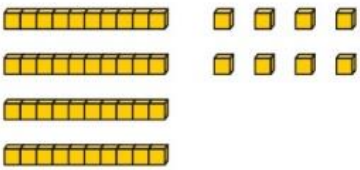
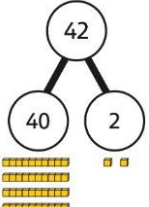
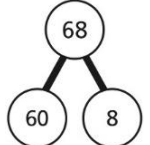


Year 3

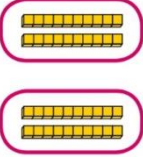

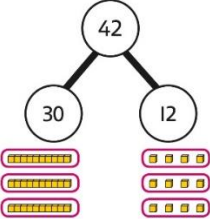


	Concrete	Pictorial	Abstract
<b>Year 3 Division</b>			
<b>Using times-tables knowledge to divide</b>	<p>Use knowledge of known times-tables to calculate divisions.</p>  <p>24 divided into groups of 8. There are 3 groups of 8.</p>	<p>Use knowledge of known times-tables to calculate divisions.</p>  <p><math>48 \div 4 = 12</math></p> <p>48 divided into groups of 4. There are 12 groups.</p> <p><math>4 \times 12 = 48</math> <math>48 \div 4 = 12</math></p>	<p>Use knowledge of known times-tables to calculate divisions.</p> <p><i>I need to work out 30 shared between 5.</i></p> <p><i>I know that <math>6 \times 5 = 30</math> so I know that <math>30 \div 5 = 6</math>.</i></p> <p>A bar model may represent the relationship between sharing and grouping.</p>  <p><math>24 \div 4 = 6</math> <math>24 \div 6 = 4</math></p> <p>Children understand how division is related to both repeated subtraction and repeated addition.</p>  <p><math>24 \div 8 = 3</math></p>  <p><math>32 \div 8 = 4</math></p>



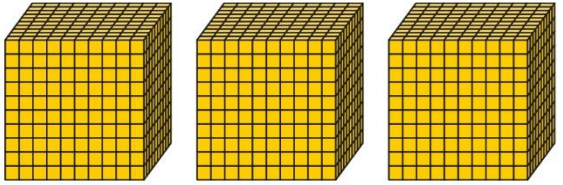

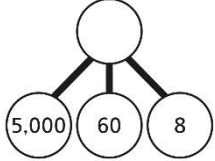
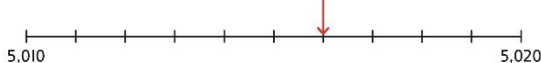


















Year 3

	Concrete	Pictorial	Abstract
<p><b>Understanding remainders</b></p>	<p>Use equipment to understand that a remainder occurs when a set of objects cannot be divided equally any further.</p>  <p><i>There are 13 sticks in total. There are 3 groups of 4, with 1 remainder.</i></p>	<p>Use images to explain remainders.</p>  <p><math>22 \div 5 = 4 \text{ remainder } 2</math></p>	<p>Understand that the remainder is what cannot be shared equally from a set.</p> <p><math>22 \div 5 = ?</math></p> <p><math>3 \times 5 = 15</math>  <math>4 \times 5 = 20</math>  <math>5 \times 5 = 25 \dots \text{this is larger than } 22</math>            So, <math>22 \div 5 = 4 \text{ remainder } 2</math></p>
<p><b>Using known facts to divide multiples of 10</b></p>	<p>Use place value equipment to understand how to divide by unitising.</p> <p><i>Make 6 ones divided by 3.</i></p>  <p><i>Now make 6 tens divided by 3.</i></p>  <p><i>What is the same? What is different?</i></p>	<p>Divide multiples of 10 by unitising.</p>  <p><i>12 tens shared into 3 equal groups. 4 tens in each group.</i></p>	<p>Divide multiples of 10 by a single digit using known times-tables.</p> <p><math>180 \div 3 = ?</math></p> <p><i>180 is 18 tens.</i></p> <p><i>18 divided by 3 is 6.</i>  <i>18 tens divided by 3 is 6 tens.</i></p> <p><math>18 \div 3 = 6</math>  <math>180 \div 3 = 60</math></p>
<p><b>2-digit number divided by 1-digit number, no remainders</b></p>	<p>Children explore dividing 2-digit numbers by using place value equipment.</p>  <p><math>48 \div 2 = ?</math></p>	<p>Children explore which partitions support particular divisions.</p> 	<p>Children partition a number into 10s and 1s to divide where appropriate.</p>  <p><math>60 \div 2 = 30</math>  <math>8 \div 2 = 4</math>  <math>30 + 4 = 34</math>  <math>68 \div 2 = 34</math></p>

Year 3

	Concrete	Pictorial	Abstract
	<p>First divide the 10s.</p>  <p>Then divide the 1s.</p> 	<p>I need to partition 42 differently to divide by 3.</p>  <p><math>42 = 30 + 12</math></p> <p><math>42 \div 3 = 14</math></p>	<p>Children partition flexibly to divide where appropriate.</p> <p><math>42 \div 3 = ?</math>  <math>42 = 40 + 2</math></p> <p>I need to partition 42 differently to divide by 3.</p> <p><math>42 = 30 + 12</math></p> <p><math>30 \div 3 = 10</math>  <math>12 \div 3 = 4</math></p> <p><math>10 + 4 = 14</math>  <math>42 \div 3 = 14</math></p>
<p><b>2-digit number divided by 1-digit number, with remainders</b></p>	<p>Use place value equipment to understand the concept of remainder.</p> <p>Make 29 from place value equipment. Share it into 2 equal groups.</p>  <p>There are two groups of 14 and 1 remainder.</p>	<p>Use place value equipment to understand the concept of remainder in division.</p> <p><math>29 \div 2 = ?</math></p>  <p><math>29 \div 2 = 14 \text{ remainder } 1</math></p>	<p>Partition to divide, understanding the remainder in context.</p> <p>67 children try to make 5 equal lines.</p> <p><math>67 = 50 + 17</math>  <math>50 \div 5 = 10</math></p> <p><math>17 \div 5 = 3 \text{ remainder } 2</math>  <math>67 \div 5 = 13 \text{ remainder } 2</math></p> <p>There are 13 children in each line and 2 children left out.</p>

Year 4

	Concrete	Pictorial	Abstract												
<b>Year 4 Addition</b>															
<b>Understanding numbers to 10,000</b>	<p>Use place value equipment to understand the place value of 4-digit numbers.</p>  <p>4 thousands equal 4,000.</p> <p>1 thousand is 10 hundreds.</p>	<p>Represent numbers using place value counters once children understand the relationship between 1,000s and 100s.</p>  $2,000 + 500 + 40 + 2 = 2,542$	<p>Understand partitioning of 4-digit numbers, including numbers with digits of 0.</p>  $5,000 + 60 + 8 = 5,068$ <p>Understand and read 4-digit numbers on a number line.</p> 												
<b>Choosing mental methods where appropriate</b>	<p>Use unitising and known facts to support mental calculations.</p> <p>Make 1,405 from place value equipment.</p> <p>Add 2,000.</p> <p>Now add the 1,000s.</p> <p>1 thousand + 2 thousands = 3 thousands</p> $1,405 + 2,000 = 3,405$	<p>Use unitising and known facts to support mental calculations.</p> <table border="1" data-bbox="952 973 1512 1141"> <thead> <tr> <th>Th</th> <th>H</th> <th>T</th> <th>O</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>I can add the 100s mentally.</p> $200 + 300 = 500$ <p>So, <math>4,256 + 300 = 4,556</math></p>	Th	H	T	O									<p>Use unitising and known facts to support mental calculations.</p> $4,256 + 300 = ?$ $2 + 3 = 5 \quad 200 + 300 = 500$ $4,256 + 300 = 4,556$
Th	H	T	O												
															
															

**Column addition with exchange**

**Concrete**

Use place value equipment on a place value grid to organise thinking.

Ensure that children understand how the columns relate to place value and what to do if the numbers are not all 4-digit numbers.

Use equipment to show  $1,905 + 775$ .

Th	H	T	O
1000	900	0	5
	700	70	5

Why have only three columns been used for the second row? Why is the Thousands box empty?

Which columns will total 10 or more?

**Pictorial**

Use place value equipment to model required exchanges.

Th	H	T	O
1000	900	0	5
	700	70	5

Th	H	T	O
1000	900	0	5
	700	70	5

Th	H	T	O
1000	900	0	5
	700	70	5

Th	H	T	O
1000	900	0	5
	700	70	5

Include examples that exchange in more than one column.

**Abstract**

Use a column method to add, including exchanges.

Th	H	T	O
1	5	5	4
+ 4	2	3	7
<hr/>			
			1

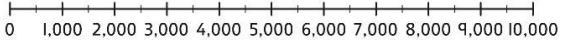
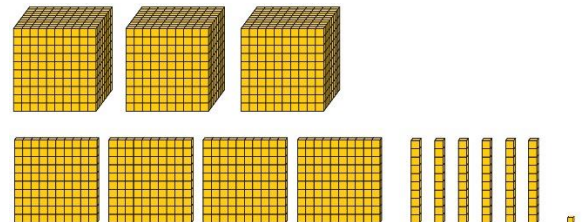
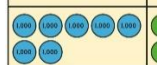


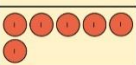
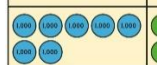


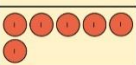
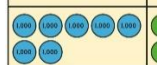


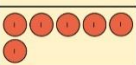
Th	H	T	O
1	5	5	4
+ 4	2	3	7
<hr/>			
		9	1

Th	H	T	O
1	5	5	4
+ 4	2	3	7
<hr/>			
	7	9	1

Th	H	T	O
1	5	5	4
+ 4	2	3	7
<hr/>			
5	7	9	1

Include examples that exchange in more than one column.

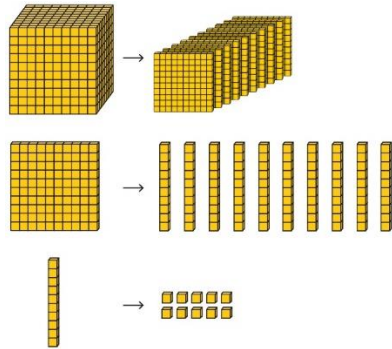
Year 4

	Concrete	Pictorial	Abstract								
<p><b>Representing additions and checking strategies</b></p>		<p>Bar models may be used to represent additions in problem contexts, and to justify mental methods where appropriate.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td colspan="2" style="text-align: center;">1,373</td> </tr> <tr> <td style="text-align: center;">799</td> <td style="text-align: center;">574</td> </tr> </table> $  \begin{array}{r}  \text{Th H T O} \\  799 \\  + 574 \\  \hline  1373  \end{array}  $ <p><i>I chose to work out <math>574 + 800</math>, then subtract 1.</i></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td colspan="2" style="text-align: center;">6,000</td> </tr> <tr> <td style="text-align: center;">2,999</td> <td style="text-align: center;">3,001</td> </tr> </table> <p><i>This is equivalent to <math>3,000 + 3,000</math>.</i></p>	1,373		799	574	6,000		2,999	3,001	<p>Use rounding and estimating on a number line to check the reasonableness of an addition.</p>  <p><math>912 + 6,149 = ?</math></p> <p><i>I used rounding to work out that the answer should be approximately <math>1,000 + 6,000 = 7,000</math>.</i></p>
1,373											
799	574										
6,000											
2,999	3,001										
<p><b>Year 4 Subtraction</b></p>											
<p><b>Choosing mental methods where appropriate</b></p>	<p>Use place value equipment to justify mental methods.</p>  <p><i>What number will be left if we take away 300?</i></p>	<p>Use place value grids to support mental methods where appropriate.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th>Th</th> <th>H</th> <th>T</th> <th>O</th> </tr> <tr> <td>  </td> <td>  </td> <td>  </td> <td>  </td> </tr> </table> <p><math>7,646 - 40 = 7,606</math></p>	Th	H	T	O					<p>Use knowledge of place value and unitising to subtract mentally where appropriate.</p> <p><math>3,501 - 2,000</math></p> <p><i>3 thousands - 2 thousands = 1 thousand</i></p> <p><math>3,501 - 2,000 = 1,501</math></p>
Th	H	T	O								
											

**Column subtraction with exchange**

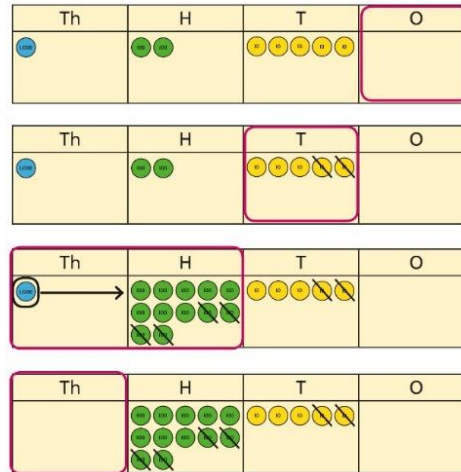
**Concrete**

Understand why exchange of a 1,000 for 100s, a 100 for 10s, or a 10 for 1s may be necessary.



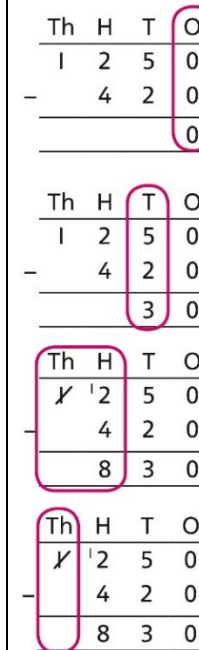
**Pictorial**

Represent place value equipment on a place value grid to subtract, including exchanges where needed.



**Abstract**

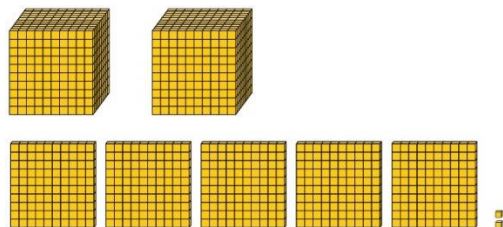
Use column subtraction, with understanding of the place value of any exchange required.



**Column subtraction with exchange across more than one column**

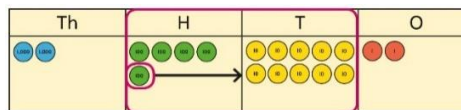
Understand why two exchanges may be necessary.

$2,502 - 243 = ?$



Make exchanges across more than one column where there is a zero as a place holder.

$2,502 - 243 = ?$



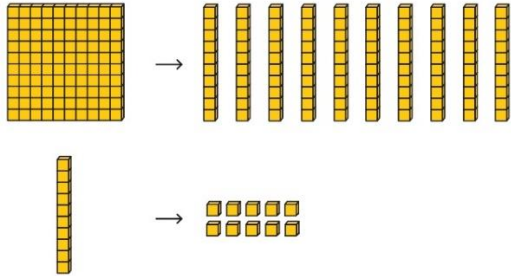
Make exchanges across more than one column where there is a zero as a place holder.

$2,502 - 243 = ?$

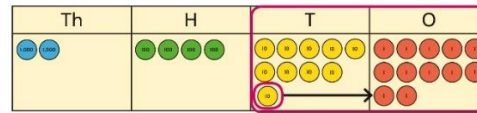


**Concrete**

*I need to exchange a 10 for some 1s, but there are not any 10s here.*



**Pictorial**



**Abstract**

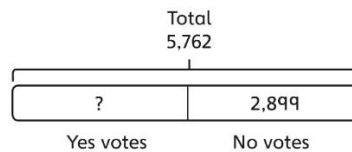
$$\begin{array}{r} \text{Th} \quad \text{H} \quad \text{T} \quad \text{O} \\ 2 \quad 4\cancel{8} \quad 10 \quad 2 \\ - \quad 2 \quad 4 \quad 3 \\ \hline \end{array}$$

$$\begin{array}{r} \text{Th} \quad \text{H} \quad \text{T} \quad \text{O} \\ 2 \quad 4\cancel{8} \quad 9\cancel{10} \quad 12 \\ - \quad 2 \quad 4 \quad 3 \\ \hline \end{array}$$

$$\begin{array}{r} \text{Th} \quad \text{H} \quad \text{T} \quad \text{O} \\ 2 \quad 4\cancel{8} \quad 9\cancel{10} \quad 12 \\ - \quad 2 \quad 4 \quad 3 \\ \hline 2 \quad 2 \quad 5 \quad 9 \end{array}$$

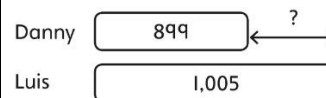
**Representing subtractions and checking strategies**

Use bar models to represent subtractions where a part needs to be calculated.



*I can work out the total number of Yes votes using  $5,762 - 2,899$ .*

Bar models can also represent 'find the difference' as a subtraction problem.



Use inverse operations to check subtractions.

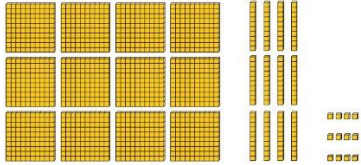
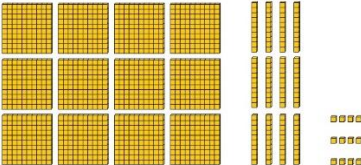

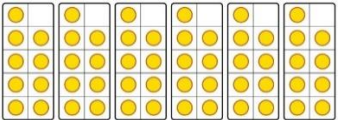
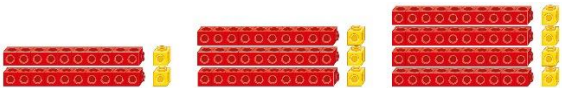

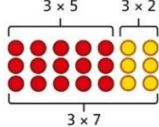
*I calculated  $1,225 - 799 = 574$ . I will check by adding the parts.*

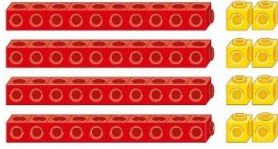
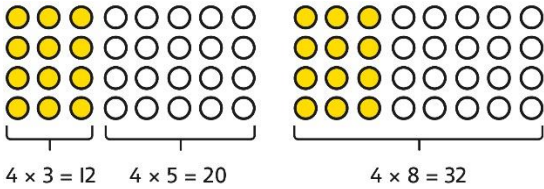
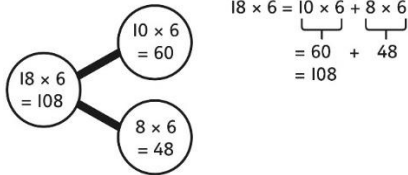
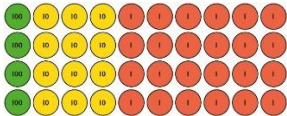
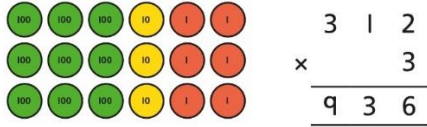
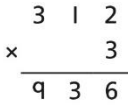
$$\begin{array}{r} \text{Th} \quad \text{H} \quad \text{T} \quad \text{O} \\ 7 \quad 9 \quad 9 \\ + \quad 5 \quad 7 \quad 4 \\ \hline 1 \quad 3 \quad 7 \quad 3 \end{array}$$

*The parts do not add to make 1,225. I must have made a mistake.*


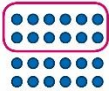


Year 4


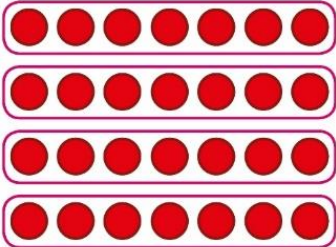
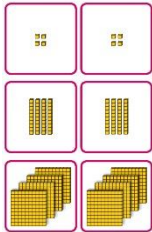



	Concrete	Pictorial	Abstract
<b>Year 4 Multiplication</b>			
<b>Multiplying by multiples of 10 and 100</b>	<p>Use unitising and place value equipment to understand how to multiply by multiples of 1, 10 and 100.</p>  <p>3 groups of 4 ones is 12 ones. 3 groups of 4 tens is 12 tens. 3 groups of 4 hundreds is 12 hundreds.</p>	<p>Use unitising and place value equipment to understand how to multiply by multiples of 1, 10 and 100.</p>  <p><math>3 \times 4 = 12</math> <math>3 \times 40 = 120</math> <math>3 \times 400 = 1,200</math></p>	<p>Use known facts and understanding of place value and commutativity to multiply mentally.</p> <p><math>4 \times 7 = 28</math></p> <p><math>4 \times 70 = 280</math> <math>40 \times 7 = 280</math></p> <p><math>4 \times 700 = 2,800</math> <math>400 \times 7 = 2,800</math></p>
<b>Understanding times-tables up to <math>12 \times 12</math></b>	<p>Understand the special cases of multiplying by 1 and 0.</p>  <p><math>5 \times 1 = 5</math>                      <math>5 \times 0 = 0</math></p>	<p>Represent the relationship between the <math>\times 9</math> table and the <math>\times 10</math> table.</p>  <p>Represent the <math>\times 11</math> table and <math>\times 12</math> tables in relation to the <math>\times 10</math> table.</p>  <p><math>2 \times 11 = 20 + 2</math> <math>3 \times 11 = 30 + 3</math> <math>4 \times 11 = 40 + 4</math></p>  <p><math>4 \times 12 = 40 + 8</math></p>	<p>Understand how times-tables relate to counting patterns.</p> <p>Understand links between the <math>\times 3</math> table, <math>\times 6</math> table and <math>\times 9</math> table <math>5 \times 6</math> is double <math>5 \times 3</math></p> <p><math>\times 5</math> table and <math>\times 6</math> table <i>I know that <math>7 \times 5 = 35</math> so I know that <math>7 \times 6 = 35 + 7</math>.</i></p> <p><math>\times 5</math> table and <math>\times 7</math> table <math>3 \times 7 = 3 \times 5 + 3 \times 2</math></p>  <p><math>\times 9</math> table and <math>\times 10</math> table <math>6 \times 10 = 60</math> <math>6 \times 9 = 60 - 6</math></p>

	Concrete	Pictorial	Abstract								
<p><b>Understanding and using partitioning in multiplication</b></p>	<p>Make multiplications by partitioning.</p> <p><math>4 \times 12</math> is 4 groups of 10 and 4 groups of 2.</p>  <p><math>4 \times 12 = 40 + 8</math></p>	<p>Understand how multiplication and partitioning are related through addition.</p>  <p><math>4 \times 3 = 12</math>  <math>4 \times 5 = 20</math>  <math>12 + 20 = 32</math></p> <p><math>4 \times 8 = 32</math></p>	<p>Use partitioning to multiply 2 or 3-digit numbers by a single digit.</p> <p><math>18 \times 6 = ?</math></p>  <p><math>18 \times 6 = 10 \times 6 + 8 \times 6</math>  <math>= 60 + 48</math>  <math>= 108</math></p> <p>Use an area model and then add the parts.</p> <table border="1" data-bbox="1556 826 2123 906"> <tr> <td></td> <td>100</td> <td>60</td> <td>3</td> </tr> <tr> <td>5</td> <td><math>100 \times 5 = 500</math></td> <td><math>60 \times 5 = 300</math></td> <td><math>3 \times 5 = 15</math></td> </tr> </table>		100	60	3	5	$100 \times 5 = 500$	$60 \times 5 = 300$	$3 \times 5 = 15$
	100	60	3								
5	$100 \times 5 = 500$	$60 \times 5 = 300$	$3 \times 5 = 15$								
<p><b>Column multiplication for 2- and 3-digit numbers multiplied by a single digit</b></p>	<p>Use place value equipment to make multiplications.</p> <p>Make <math>4 \times 136</math> using equipment.</p>  <p>I can work out how many 1s, 10s and 100s.</p> <p>There are <math>4 \times 6</math> ones... 24 ones          There are <math>4 \times 3</math> tens ... 12 tens          There are <math>4 \times 1</math> hundreds ... 4 hundreds</p>	<p>Use place value equipment alongside a column method for multiplication of up to 3-digit numbers by a single digit.</p>  <p><math>312 \times 3 = 936</math></p>	<p>Use the formal column method for up to 3-digit numbers multiplied by a single digit.</p>  <p>Understand how the expanded column method is related to the formal column method and understand how any exchanges are related to place value at each stage of the calculation.</p>								

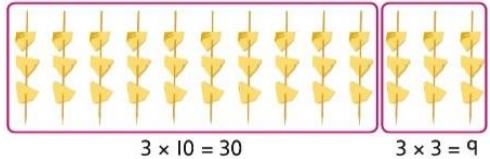
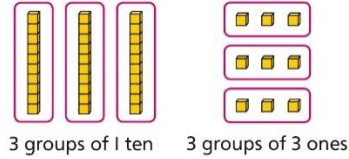
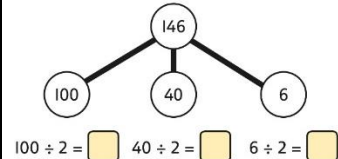
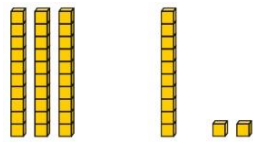
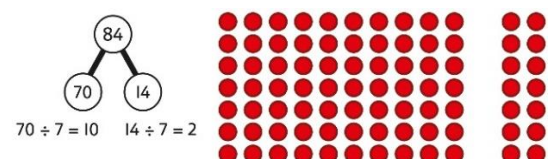
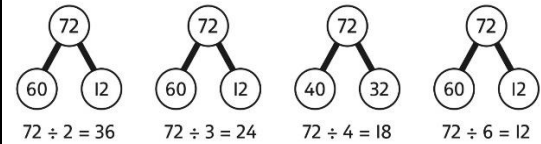
Year 4

	Concrete	Pictorial	Abstract
	$24 + 120 + 400 = 544$		$\begin{array}{r} 23 \\ \times 5 \\ \hline 115 \\ \hline 100 \\ \hline 115 \end{array}$
<p><b>Multiplying more than two numbers</b></p>	<p>Represent situations by multiplying three numbers together.</p>  <p>Each sheet has <math>2 \times 5</math> stickers. There are 3 sheets.</p> <p>There are <math>5 \times 2 \times 3</math> stickers in total.</p> $\underbrace{5 \times 2}_{10} \times 3 = 30$ $10 \times 3 = 30$	<p>Understand that commutativity can be used to multiply in different orders.</p>  $2 \times 6 \times 10 = 120$ $12 \times 10 = 120$ $10 \times 6 \times 2 = 120$ $60 \times 2 = 120$	<p>Use knowledge of factors to simplify some multiplications.</p> $24 \times 5 = 12 \times 2 \times 5$ $12 \times 2 \times 5 =$ $\underbrace{12 \times 2}_{12} \times 5 = 120$ <p>So, <math>24 \times 5 = 120</math></p>

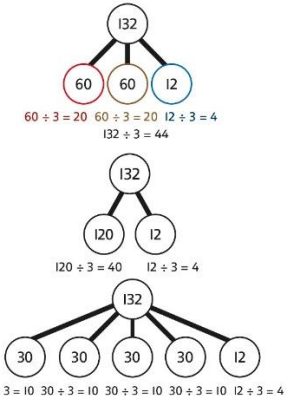
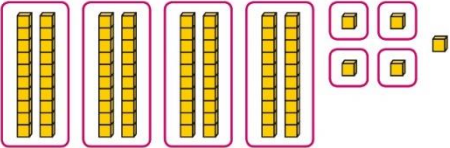
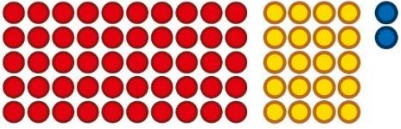
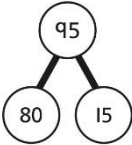
Year 4

	Concrete	Pictorial	Abstract
<b>Year 4 Division</b>			
<b>Understanding the relationship between multiplication and division, including times-tables</b>	<p>Use objects to explore families of multiplication and division facts.</p>  <p><math>4 \times 6 = 24</math>  <math>24</math> is 6 groups of 4.  <math>24</math> is 4 groups of 6.</p> <p><math>24</math> divided by 6 is 4.  <math>24</math> divided by 4 is 6.</p>	<p>Represent divisions using an array.</p>  <p><math>28 \div 7 = 4</math></p>	<p>Understand families of related multiplication and division facts.</p> <p><i>I know that <math>5 \times 7 = 35</math></i></p> <p><i>so I know all these facts:</i></p> <p><math>5 \times 7 = 35</math>  <math>7 \times 5 = 35</math>  <math>35 = 5 \times 7</math>  <math>35 = 7 \times 5</math>  <math>35 \div 5 = 7</math>  <math>35 \div 7 = 5</math>  <math>7 = 35 \div 5</math>  <math>5 = 35 \div 7</math></p>
<b>Dividing multiples of 10 and 100 by a single digit</b>	<p>Use place value equipment to understand how to use unitising to divide.</p>  <p><i>8 ones divided into 2 equal groups  4 ones in each group</i></p> <p><i>8 tens divided into 2 equal groups  4 tens in each group</i></p> <p><i>8 hundreds divided into 2 equal groups  4 hundreds in each group</i></p>	<p>Represent divisions using place value equipment.</p> <p><math>9 \div 3 = \square</math></p>  <p><math>90 \div 3 = \square</math></p>  <p><math>900 \div 3 = \square</math></p>  <p><math>9 \div 3 = 3</math></p> <p><i>9 tens divided by 3 is 3 tens.  9 hundreds divided by 3 is 3 hundreds.</i></p>	<p>Use known facts to divide 10s and 100s by a single digit.</p> <p><math>15 \div 3 = 5</math></p> <p><math>150 \div 3 = 50</math></p> <p><math>1500 \div 3 = 500</math></p>

Year 4

	Concrete	Pictorial	Abstract
<p><b>Dividing 2-digit and 3-digit numbers by a single digit by partitioning into 100s, 10s and 1s</b></p>	<p>Partition into 10s and 1s to divide where appropriate.</p> <p><math>39 \div 3 = ?</math></p>  <p><math>3 \times 10 = 30</math>      <math>3 \times 3 = 9</math></p> <p><math>39 = 30 + 9</math></p> <p><math>30 \div 3 = 10</math>  <math>9 \div 3 = 3</math>  <math>39 \div 3 = 13</math></p>	<p>Partition into 100s, 10s and 1s using Base 10 equipment to divide where appropriate.</p> <p><math>39 \div 3 = ?</math></p>  <p>3 groups of 1 ten      3 groups of 3 ones</p> <p><math>39 = 30 + 9</math></p> <p><math>30 \div 3 = 10</math>  <math>9 \div 3 = 3</math>  <math>39 \div 3 = 13</math></p>	<p>Partition into 100s, 10s and 1s using a part-whole model to divide where appropriate.</p> <p><math>142 \div 2 = ?</math></p>  <p><math>100 \div 2 = \square</math>    <math>40 \div 2 = \square</math>    <math>6 \div 2 = \square</math></p> <p><math>100 \div 2 = 50</math>  <math>40 \div 2 = 20</math>  <math>6 \div 2 = 3</math>  <math>50 + 20 + 3 = 73</math>  <math>142 \div 2 = 73</math></p>
<p><b>Dividing 2-digit and 3-digit numbers by a single digit, using flexible partitioning</b></p>	<p>Use place value equipment to explore why different partitions are needed.</p> <p><math>42 \div 3 = ?</math></p> <p><i>I will split it into 30 and 12, so that I can divide by 3 more easily.</i></p> 	<p>Represent how to partition flexibly where needed.</p> <p><math>84 \div 7 = ?</math></p> <p><i>I will partition into 70 and 14 because I am dividing by 7.</i></p>  <p><math>70 \div 7 = 10</math>    <math>14 \div 7 = 2</math></p> <p><math>84 \div 7 = 12</math></p>	<p>Make decisions about appropriate partitioning based on the division required.</p>  <p><math>72 \div 2 = 36</math>    <math>72 \div 3 = 24</math>    <math>72 \div 4 = 18</math>    <math>72 \div 6 = 12</math></p> <p>Understand that different partitions can be used to complete the same division.</p>

Year 4

	Concrete	Pictorial	Abstract
			
<p><b>Understanding remainders</b></p>	<p>Use place value equipment to find remainders.</p> <p><i>85 shared into 4 equal groups</i></p> <p><i>There are 24, and 1 that cannot be shared.</i></p> 	<p>Represent the remainder as the part that cannot be shared equally.</p>  <p><math>72 \div 5 = 14 \text{ remainder } 2</math></p>	<p>Understand how partitioning can reveal remainders of divisions.</p>  <p><math>80 \div 4 = 20</math></p> <p><math>12 \div 4 = 3</math></p> <p><math>95 \div 4 = 23 \text{ remainder } 3</math></p>



## UPPER KEY STAGE 2

In upper Key Stage 2, children build on secure foundations in calculation, and develop fluency, accuracy and flexibility in their approach to the four operations. They work with whole numbers and adapt their skills to work with decimals, and they continue to develop their ability to select appropriate, accurate and efficient operations.

**Key language:** decimal, column methods, exchange, partition, mental method, ten thousand, hundred thousand, million, factor, multiple, prime number, square number, cube number

**Addition and subtraction:** Children build on their column methods to add and subtract numbers with up to seven digits, and they adapt the methods to calculate efficiently and effectively with decimals, ensuring understanding of place value at every stage.

Children compare and contrast methods, and they select mental methods or jottings where appropriate and where these are more likely to be efficient or accurate when compared with formal column methods.

Bar models are used to represent the calculations required to solve problems and may indicate where efficient methods can be chosen.

**Multiplication and division:** Building on their understanding, children develop methods to multiply up to 4-digit numbers by single-digit and 2-digit numbers.

Children develop column methods with an understanding of place value, and they continue to use the key skill of unitising to multiply and divide by 10, 100 and 1,000.

Written division methods are introduced and adapted for division by single-digit and 2-digit numbers and are understood alongside the area model and place value. In Year 6, children develop a secure understanding of how division is related to fractions.

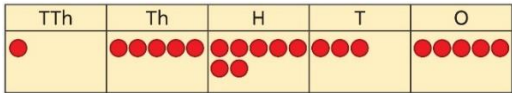
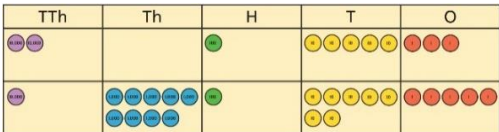
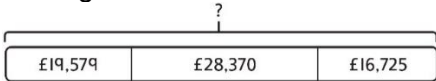
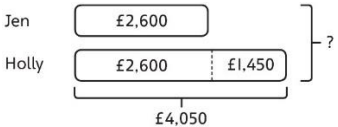
Multiplication and division of decimals are also introduced and refined in Year 6.


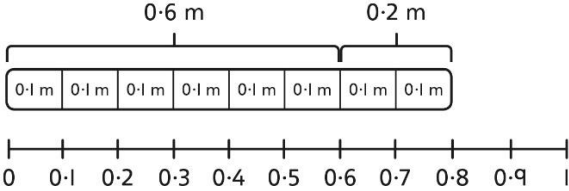
**Fractions:** Children find fractions of amounts, multiply a fraction by a whole number and by another fraction, divide a fraction by a whole number, and add and subtract fractions with different denominators. Children become more confident working with improper fractions and mixed numbers and can calculate with them.

Understanding of decimals with up to 3 decimal places is built through place value and as fractions, and children calculate with decimals in the context of measure as well as in pure arithmetic.

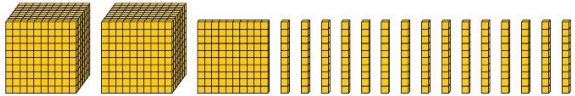
Children develop an understanding of percentages in relation to hundredths, and they understand how to work with common percentages: 50%, 25%, 10% and 1%.

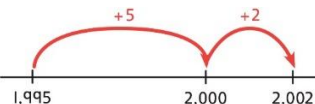

Year 5

	Concrete	Pictorial	Abstract
<b>Year 5 Addition</b>			
<b>Column addition with whole numbers</b>	<p>Use place value equipment to represent additions.</p> <p><i>Add a row of counters onto the place value grid to show <math>15,735 + 4,012</math>.</i></p> 	<p>Represent additions, using place value equipment on a place value grid alongside written methods.</p>  <p><i>I need to exchange 10 tens for a 100.</i></p> $\begin{array}{r} \text{TTh Th H T O} \\ 2 \ 0 \ 1 \ 5 \ 3 \\ + \ 1 \ 4 \ 0 \ 1 \ 2 \\ \hline 3 \ 4 \ 1 \ 6 \ 5 \end{array}$	<p>Use column addition, including exchanges.</p> $\begin{array}{r} \text{TTh Th H T O} \\ 1 \ 9 \ 1 \ 7 \ 5 \\ + \ 1 \ 8 \ 4 \ 1 \ 7 \\ \hline 3 \ 7 \ 5 \ 8 \ 2 \\ \hline \end{array}$
<b>Representing additions</b>		<p>Bar models represent addition of two or more numbers in the context of problem solving.</p>   $\begin{array}{r} \text{Th H T O} \\ 2 \ 6 \ 0 \ 0 \\ + \ 1 \ 4 \ 5 \ 0 \\ \hline 4 \ 0 \ 5 \ 0 \end{array} \qquad \begin{array}{r} \text{Th H T O} \\ 2 \ 6 \ 0 \ 0 \\ + \ 4 \ 0 \ 5 \ 0 \\ \hline 6 \ 6 \ 5 \ 0 \end{array}$	<p>Use approximation to check whether answers are reasonable.</p> $\begin{array}{r} \text{TTh Th H T O} \\ 2 \ 3 \ 4 \ 0 \ 5 \\ + \ 7 \ 8 \ 9 \ 2 \\ \hline 2 \ 0 \ 2 \ 9 \ 7 \end{array} \qquad \begin{array}{r} \text{TTh Th H T O} \\ 2 \ 3 \ 4 \ 0 \ 5 \\ + \ 7 \ 8 \ 9 \ 2 \\ \hline 3 \ 1 \ 2 \ 9 \ 7 \\ \hline \end{array}$ <p><i>I will use <math>23,000 + 8,000</math> to check.</i></p>
<b>Adding tenths</b>	<p>Link measure with addition of decimals.</p> <p><i>Two lengths of fencing are 0.6 m and 0.2 m.</i></p>	<p>Use a bar model with a number line to add tenths.</p>	<p>Understand the link with adding fractions.</p> $\frac{6}{10} + \frac{2}{10} = \frac{8}{10}$

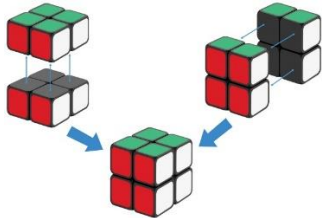
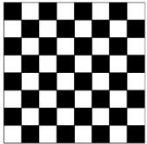
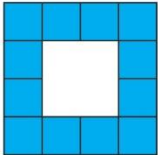


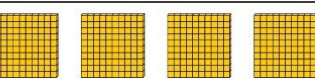


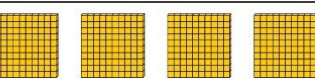
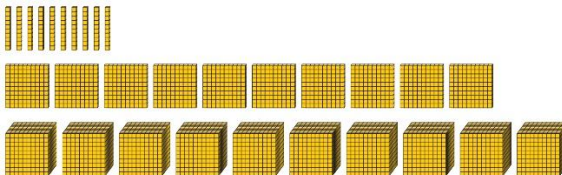


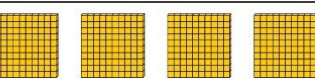
	Concrete	Pictorial	Abstract																																																																																												
	<p>How long are they when added together?</p> 	 <p><math>0.6 + 0.2 = 0.8</math>  <math>6 \text{ tenths} + 2 \text{ tenths} = 8 \text{ tenths}</math></p>	<p><math>6 \text{ tenths} + 2 \text{ tenths} = 8 \text{ tenths}</math>  <math>0.6 + 0.2 = 0.8</math></p>																																																																																												
<p><b>Adding decimals using column addition</b></p>	<p>Use place value equipment to represent additions.</p> <p>Show <math>0.23 + 0.45</math> using place value counters.</p>	<p>Use place value equipment on a place value grid to represent additions.</p> <p>Represent exchange where necessary.</p> <table border="1" data-bbox="974 724 1384 852"> <thead> <tr> <th>O</th> <th>.</th> <th>Tth</th> <th>Hth</th> </tr> </thead> <tbody> <tr> <td></td> <td>.</td> <td>2 3</td> <td></td> </tr> <tr> <td></td> <td>.</td> <td>4 5</td> <td></td> </tr> <tr> <td></td> <td>.</td> <td>6 8</td> <td></td> </tr> </tbody> </table> <p><math>0.23 + 0.45 = 0.68</math></p> <p>Include examples where the numbers of decimal places are different.</p> <table border="1" data-bbox="974 1023 1397 1129"> <thead> <tr> <th>O</th> <th>.</th> <th>Tth</th> <th>Hth</th> </tr> </thead> <tbody> <tr> <td>5</td> <td>.</td> <td>0 0</td> <td></td> </tr> <tr> <td>1</td> <td>.</td> <td>2 5</td> <td></td> </tr> <tr> <td>6</td> <td>.</td> <td>2 5</td> <td></td> </tr> </tbody> </table> <p><math>5.00 + 1.25 = 6.25</math></p>	O	.	Tth	Hth		.	2 3			.	4 5			.	6 8		O	.	Tth	Hth	5	.	0 0		1	.	2 5		6	.	2 5		<p>Add using a column method, ensuring that children understand the link with place value.</p> <table border="1" data-bbox="1576 687 1727 810"> <thead> <tr> <th>O</th> <th>.</th> <th>Tth</th> <th>Hth</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>.</td> <td>2</td> <td>3</td> </tr> <tr> <td>+</td> <td>0</td> <td>4</td> <td>5</td> </tr> <tr> <td colspan="4"><hr/></td> </tr> <tr> <td>0</td> <td>.</td> <td>6</td> <td>8</td> </tr> </tbody> </table> <p>Include exchange where required, alongside an understanding of place value.</p> <table border="1" data-bbox="1576 911 1715 1034"> <thead> <tr> <th>O</th> <th>.</th> <th>Tth</th> <th>Hth</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>.</td> <td>9</td> <td>2</td> </tr> <tr> <td>+</td> <td>0</td> <td>3</td> <td>3</td> </tr> <tr> <td colspan="4"><hr/></td> </tr> <tr> <td>1</td> <td>.</td> <td>2</td> <td>5</td> </tr> </tbody> </table> <p>Include additions where the numbers of decimal places are different.</p> <p><math>3.4 + 0.65 = ?</math></p> <table border="1" data-bbox="1576 1222 1704 1329"> <thead> <tr> <th>O</th> <th>.</th> <th>Tth</th> <th>Hth</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>.</td> <td>4</td> <td>0</td> </tr> <tr> <td>+</td> <td>0</td> <td>6</td> <td>5</td> </tr> <tr> <td colspan="4"><hr/></td> </tr> <tr> <td></td> <td>.</td> <td></td> <td></td> </tr> </tbody> </table>	O	.	Tth	Hth	0	.	2	3	+	0	4	5	<hr/>				0	.	6	8	O	.	Tth	Hth	0	.	9	2	+	0	3	3	<hr/>				1	.	2	5	O	.	Tth	Hth	3	.	4	0	+	0	6	5	<hr/>					.		
O	.	Tth	Hth																																																																																												
	.	2 3																																																																																													
	.	4 5																																																																																													
	.	6 8																																																																																													
O	.	Tth	Hth																																																																																												
5	.	0 0																																																																																													
1	.	2 5																																																																																													
6	.	2 5																																																																																													
O	.	Tth	Hth																																																																																												
0	.	2	3																																																																																												
+	0	4	5																																																																																												
<hr/>																																																																																															
0	.	6	8																																																																																												
O	.	Tth	Hth																																																																																												
0	.	9	2																																																																																												
+	0	3	3																																																																																												
<hr/>																																																																																															
1	.	2	5																																																																																												
O	.	Tth	Hth																																																																																												
3	.	4	0																																																																																												
+	0	6	5																																																																																												
<hr/>																																																																																															
	.																																																																																														

Year 5

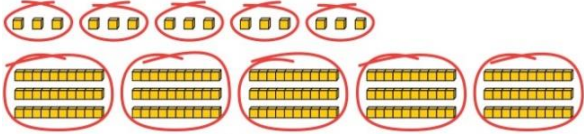

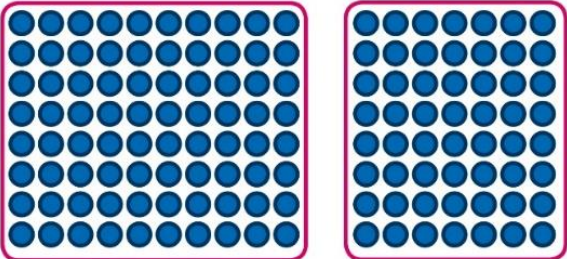
	Concrete	Pictorial	Abstract																																																																																																																																		
<b>Year 5 Subtraction</b>																																																																																																																																					
<b>Column subtraction with whole numbers</b>	<p>Use place value equipment to understand where exchanges are required.</p> <p><math>2,250 - 1,070</math></p> 	<p>Represent the stages of the calculation using place value equipment on a grid alongside the calculation, including exchanges where required.</p> <p><math>15,735 - 2,582 = 13,153</math></p> <table border="1" data-bbox="976 552 1391 619"> <tr><th>TTh</th><th>Th</th><th>H</th><th>T</th><th>O</th></tr> <tr><td>●</td><td>●●●●●</td><td>●●●●●</td><td>●●●●●</td><td>●●●●●</td></tr> </table> <p>Now subtract the 10s. Exchange 1 hundred for 10 tens.</p> <table border="1" data-bbox="976 695 1391 778"> <tr><th>TTh</th><th>Th</th><th>H</th><th>T</th><th>O</th></tr> <tr><td>●</td><td>●●●●●</td><td>●●</td><td>●●●●●●●●</td><td>●●●●●</td></tr> </table> <p>Subtract the 100s, 1,000s and 10,000s.</p> <table border="1" data-bbox="976 831 1391 914"> <tr><th>TTh</th><th>Th</th><th>H</th><th>T</th><th>O</th></tr> <tr><td>●</td><td>●●●●</td><td>●●</td><td>●●●●●●</td><td>●●●●</td></tr> </table> <table border="1" data-bbox="1406 552 1552 651"> <tr><th>TTh</th><th>Th</th><th>H</th><th>T</th><th>O</th></tr> <tr><td>1</td><td>5</td><td>7</td><td>3</td><td>5</td></tr> <tr><td>-</td><td>2</td><td>5</td><td>8</td><td>2</td></tr> <tr><td colspan="5"><hr/></td></tr> <tr><td></td><td></td><td></td><td>3</td><td></td></tr> </table> <table border="1" data-bbox="1406 695 1552 794"> <tr><th>TTh</th><th>Th</th><th>H</th><th>T</th><th>O</th></tr> <tr><td>1</td><td>5</td><td>7</td><td>3</td><td>5</td></tr> <tr><td>-</td><td>2</td><td>5</td><td>8</td><td>2</td></tr> <tr><td colspan="5"><hr/></td></tr> <tr><td></td><td></td><td>5</td><td>3</td><td></td></tr> </table> <table border="1" data-bbox="1406 831 1552 914"> <tr><th>TTh</th><th>Th</th><th>H</th><th>T</th><th>O</th></tr> <tr><td>1</td><td>5</td><td>7</td><td>3</td><td>5</td></tr> <tr><td>-</td><td>2</td><td>5</td><td>8</td><td>2</td></tr> <tr><td colspan="5"><hr/></td></tr> <tr><td>1</td><td>3</td><td>1</td><td>5</td><td>3</td></tr> </table>	TTh	Th	H	T	O	●	●●●●●	●●●●●	●●●●●	●●●●●	TTh	Th	H	T	O	●	●●●●●	●●	●●●●●●●●	●●●●●	TTh	Th	H	T	O	●	●●●●	●●	●●●●●●	●●●●	TTh	Th	H	T	O	1	5	7	3	5	-	2	5	8	2	<hr/>								3		TTh	Th	H	T	O	1	5	7	3	5	-	2	5	8	2	<hr/>							5	3		TTh	Th	H	T	O	1	5	7	3	5	-	2	5	8	2	<hr/>					1	3	1	5	3	<p>Use column subtraction methods with exchange where required.</p> <table border="1" data-bbox="1585 416 1787 552"> <tr><th>TTh</th><th>Th</th><th>H</th><th>T</th><th>O</th></tr> <tr><td>5</td><td>2</td><td>1</td><td>0</td><td>9</td></tr> <tr><td>-</td><td>1</td><td>8</td><td>5</td><td>3</td></tr> <tr><td colspan="5"><hr/></td></tr> <tr><td>4</td><td>3</td><td>5</td><td>6</td><td>3</td></tr> </table> <p><math>62,097 - 18,534 = 43,563</math></p>	TTh	Th	H	T	O	5	2	1	0	9	-	1	8	5	3	<hr/>					4	3	5	6	3
TTh	Th	H	T	O																																																																																																																																	
●	●●●●●	●●●●●	●●●●●	●●●●●																																																																																																																																	
TTh	Th	H	T	O																																																																																																																																	
●	●●●●●	●●	●●●●●●●●	●●●●●																																																																																																																																	
TTh	Th	H	T	O																																																																																																																																	
●	●●●●	●●	●●●●●●	●●●●																																																																																																																																	
TTh	Th	H	T	O																																																																																																																																	
1	5	7	3	5																																																																																																																																	
-	2	5	8	2																																																																																																																																	
<hr/>																																																																																																																																					
			3																																																																																																																																		
TTh	Th	H	T	O																																																																																																																																	
1	5	7	3	5																																																																																																																																	
-	2	5	8	2																																																																																																																																	
<hr/>																																																																																																																																					
		5	3																																																																																																																																		
TTh	Th	H	T	O																																																																																																																																	
1	5	7	3	5																																																																																																																																	
-	2	5	8	2																																																																																																																																	
<hr/>																																																																																																																																					
1	3	1	5	3																																																																																																																																	
TTh	Th	H	T	O																																																																																																																																	
5	2	1	0	9																																																																																																																																	
-	1	8	5	3																																																																																																																																	
<hr/>																																																																																																																																					
4	3	5	6	3																																																																																																																																	
<b>Checking strategies and representing subtractions</b>		<p>Bar models represent subtractions in problem contexts, including 'find the difference'.</p> <p>Athletics Stadium <span style="border: 1px solid black; padding: 2px 20px;">75,450</span></p> <p>Hockey Centre <span style="border: 1px solid black; padding: 2px 20px;">← 42,300 →</span></p> <p>Velodrome <span style="border: 1px solid black; padding: 2px 20px;">15,735 ← ? →</span></p>	<p>Children can explain the mistake made when the columns have not been ordered correctly.</p> <table border="1" data-bbox="1585 1082 1731 1209"> <tr><th colspan="5">Bella's working</th></tr> <tr><th>TTh</th><th>Th</th><th>H</th><th>T</th><th>O</th></tr> <tr><td>1</td><td>7</td><td>8</td><td>7</td><td>7</td></tr> <tr><td>+ 4</td><td>0</td><td>1</td><td>2</td><td></td></tr> <tr><td colspan="5"><hr/></td></tr> <tr><td>5</td><td>7</td><td>9</td><td>9</td><td>7</td></tr> </table> <table border="1" data-bbox="1765 1082 1910 1209"> <tr><th colspan="5">Correct method</th></tr> <tr><th>TTh</th><th>Th</th><th>H</th><th>T</th><th>O</th></tr> <tr><td>1</td><td>7</td><td>8</td><td>7</td><td>7</td></tr> <tr><td>+ 4</td><td>0</td><td>1</td><td>2</td><td></td></tr> <tr><td colspan="5"><hr/></td></tr> <tr><td>2</td><td>1</td><td>8</td><td>8</td><td>9</td></tr> </table> <p>Use approximation to check calculations.</p> <p><i>I calculated <math>18,000 + 4,000</math> mentally to check my subtraction.</i></p>	Bella's working					TTh	Th	H	T	O	1	7	8	7	7	+ 4	0	1	2		<hr/>					5	7	9	9	7	Correct method					TTh	Th	H	T	O	1	7	8	7	7	+ 4	0	1	2		<hr/>					2	1	8	8	9																																																																						
Bella's working																																																																																																																																					
TTh	Th	H	T	O																																																																																																																																	
1	7	8	7	7																																																																																																																																	
+ 4	0	1	2																																																																																																																																		
<hr/>																																																																																																																																					
5	7	9	9	7																																																																																																																																	
Correct method																																																																																																																																					
TTh	Th	H	T	O																																																																																																																																	
1	7	8	7	7																																																																																																																																	
+ 4	0	1	2																																																																																																																																		
<hr/>																																																																																																																																					
2	1	8	8	9																																																																																																																																	


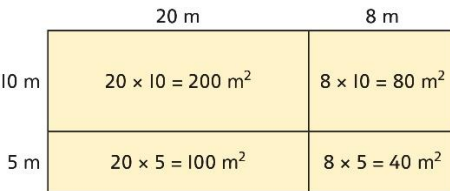
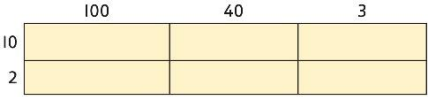
	Concrete	Pictorial	Abstract																																																																								
<p><b>Choosing efficient methods</b></p>			<p>To subtract two large numbers that are close, children find the difference by counting on.  <math>2,002 - 1,995 = ?</math></p>  <p>Use addition to check subtractions.  <i>I calculated <math>7,546 - 2,355 = 5,191</math>.</i>  <i>I will check using the inverse.</i></p>																																																																								
<p><b>Subtracting decimals</b></p>	<p>Explore complements to a whole number by working in the context of length.</p>  <p>1 m - <input type="text"/> m = <input type="text"/> m</p> <p><math>1 - 0.49 = ?</math></p>	<p>Use a place value grid to represent the stages of column subtraction, including exchanges where required.</p> <p><math>5.74 - 2.25 = ?</math></p> <table border="1" data-bbox="981 869 1400 965"> <tr><td>O</td><td>•</td><td>Tth</td><td>Hth</td></tr> <tr><td>●●●●</td><td>•</td><td>●●●●●●</td><td>●●●●●●</td></tr> </table> <p>Exchange 1 tenth for 10 hundredths.</p> <table border="1" data-bbox="981 1005 1400 1125"> <tr><td>O</td><td>•</td><td>Tth</td><td>Hth</td></tr> <tr><td>●●●●</td><td>•</td><td>●●●●●●</td><td>●●●●●●</td></tr> </table> <p>Now subtract the 5 hundredths.</p> <table border="1" data-bbox="981 1165 1400 1284"> <tr><td>O</td><td>•</td><td>Tth</td><td>Hth</td></tr> <tr><td>●●●●</td><td>•</td><td>●●●●●●</td><td>●●●●●●</td></tr> </table> <p>Now subtract the 2 tenths, then the 2 ones.</p> <table border="1" data-bbox="981 1324 1400 1444"> <tr><td>O</td><td>•</td><td>Tth</td><td>Hth</td></tr> <tr><td>●●●●</td><td>•</td><td>●●●●●●</td><td>●●●●●●</td></tr> </table>	O	•	Tth	Hth	●●●●	•	●●●●●●	●●●●●●	O	•	Tth	Hth	●●●●	•	●●●●●●	●●●●●●	O	•	Tth	Hth	●●●●	•	●●●●●●	●●●●●●	O	•	Tth	Hth	●●●●	•	●●●●●●	●●●●●●	<p>Use column subtraction, with an understanding of place value, including subtracting numbers with different numbers of decimal places.</p> <p><math>3.921 - 3.75 = ?</math></p> <table border="1" data-bbox="1579 893 1836 1045"> <tr><td>O</td><td>•</td><td>Tth</td><td>Hth</td><td>Thth</td></tr> <tr><td>5</td><td>•</td><td>7</td><td>4</td><td></td></tr> <tr><td>-</td><td></td><td>2</td><td>2</td><td>5</td></tr> <tr><td colspan="5"><hr/></td></tr> <tr><td>3</td><td>•</td><td>9</td><td>2</td><td>1</td></tr> <tr><td>-</td><td></td><td>3</td><td>7</td><td>5</td></tr> <tr><td colspan="5"><hr/></td></tr> <tr><td></td><td></td><td></td><td></td><td>0</td></tr> </table>	O	•	Tth	Hth	Thth	5	•	7	4		-		2	2	5	<hr/>					3	•	9	2	1	-		3	7	5	<hr/>									0
O	•	Tth	Hth																																																																								
●●●●	•	●●●●●●	●●●●●●																																																																								
O	•	Tth	Hth																																																																								
●●●●	•	●●●●●●	●●●●●●																																																																								
O	•	Tth	Hth																																																																								
●●●●	•	●●●●●●	●●●●●●																																																																								
O	•	Tth	Hth																																																																								
●●●●	•	●●●●●●	●●●●●●																																																																								
O	•	Tth	Hth	Thth																																																																							
5	•	7	4																																																																								
-		2	2	5																																																																							
<hr/>																																																																											
3	•	9	2	1																																																																							
-		3	7	5																																																																							
<hr/>																																																																											
				0																																																																							

Year 5

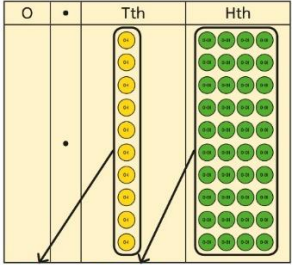
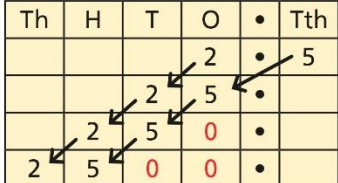
	Concrete	Pictorial	Abstract												
<b>Year 5 Multiplication</b>															
<b>Understanding factors</b>	<p>Use cubes or counters to explore the meaning of 'square numbers'.</p> <p><i>25 is a square number because it is made from 5 rows of 5.</i></p> <p>Use cubes to explore cube numbers.</p>  <p><i>8 is a cube number.</i></p>	<p>Use images to explore examples and non-examples of square numbers.</p>  <p><math>8 \times 8 = 64</math> <math>8^2 = 64</math></p>  <p><i>12 is not a square number, because you cannot multiply a whole number by itself to make 12.</i></p>	<p>Understand the pattern of square numbers in the multiplication tables.</p> <p>Use a multiplication grid to circle each square number. Can children spot a pattern?</p>												
<b>Multiplying by 10, 100 and 1,000</b>	<p>Use place value equipment to multiply by 10, 100 and 1,000 by unitising.</p> <table border="1" data-bbox="369 1082 940 1252"> <tr> <td><math>4 \times 1 = 4 \text{ ones} = 4</math></td> <td></td> </tr> <tr> <td><math>4 \times 10 = 4 \text{ tens} = 40</math></td> <td></td> </tr> <tr> <td><math>4 \times 100 = 4 \text{ hundreds} = 400</math></td> <td></td> </tr> </table>	$4 \times 1 = 4 \text{ ones} = 4$		$4 \times 10 = 4 \text{ tens} = 40$		$4 \times 100 = 4 \text{ hundreds} = 400$		<p>Understand the effect of repeated multiplication by 10.</p> 	<p>Understand how exchange relates to the digits when multiplying by 10, 100 and 1,000.</p> <table border="1" data-bbox="1579 1117 1948 1252"> <tr> <td>H</td> <td>T</td> <td>O</td> </tr> <tr> <td></td> <td>I</td> <td>7</td> </tr> </table> <p><math>17 \times 10 = 170</math>  <math>17 \times 100 = 17 \times 10 \times 10 = 1,700</math>  <math>17 \times 1,000 = 17 \times 10 \times 10 \times 10 = 17,000</math></p>	H	T	O		I	7
$4 \times 1 = 4 \text{ ones} = 4$															
$4 \times 10 = 4 \text{ tens} = 40$															
$4 \times 100 = 4 \text{ hundreds} = 400$															
H	T	O													
	I	7													




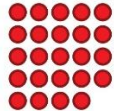
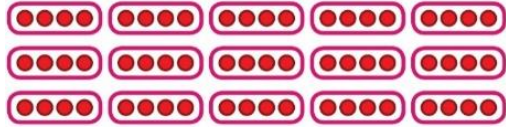
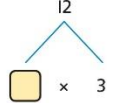
	Concrete	Pictorial	Abstract																																
<p><b>Multiplying by multiples of 10, 100 and 1,000</b></p>	<p>Use place value equipment to explore multiplying by unitising.</p>  <p>5 groups of 3 ones is 15 ones. 5 groups of 3 tens is 15 tens.</p> <p>So, I know that 5 groups of 3 thousands would be 15 thousands.</p>	<p>Use place value equipment to represent how to multiply by multiples of 10, 100 and 1,000.</p>  <p><math>4 \times 3 = 12</math>                      <math>6 \times 4 = 24</math> <math>4 \times 30 = 1,200</math>                <math>6 \times 400 = 2,400</math></p>	<p>Use known facts and unitising to multiply.</p> <p><math>5 \times 4 = 20</math> <math>5 \times 40 = 200</math> <math>5 \times 400 = 2,000</math> <math>5 \times 4,000 = 20,000</math></p> <p><math>5,000 \times 4 = 20,000</math></p>																																
<p><b>Multiplying up to 4-digit numbers by a single digit</b></p>	<p>Explore how to use partitioning to multiply efficiently.</p> <p><math>8 \times 17 = ?</math></p>  <p><math>8 \times 10 = 80</math>                      <math>8 \times 7 = 56</math></p> <p><math>80 + 56 = 136</math></p> <p>So, <math>8 \times 17 = 136</math></p>	<p>Represent multiplications using place value equipment and add the 1s, then 10s, then 100s, then 1,000s.</p> <table border="1" data-bbox="976 866 1424 1276"> <thead> <tr> <th></th> <th>H</th> <th>T</th> <th>O</th> </tr> </thead> <tbody> <tr> <td>1000</td> <td></td> <td>10 10 10 10 10</td> <td>1 1 1</td> </tr> <tr> <td>100</td> <td></td> <td>10 10 10 10 10</td> <td>1 1 1</td> </tr> <tr> <td>100</td> <td></td> <td>10 10 10 10 10</td> <td>1 1 1</td> </tr> <tr> <td>100</td> <td></td> <td>10 10 10 10 10</td> <td>1 1 1</td> </tr> <tr> <td>100</td> <td></td> <td>10 10 10 10 10</td> <td>1 1 1</td> </tr> </tbody> </table>		H	T	O	1000		10 10 10 10 10	1 1 1	100		10 10 10 10 10	1 1 1	100		10 10 10 10 10	1 1 1	100		10 10 10 10 10	1 1 1	100		10 10 10 10 10	1 1 1	<p>Use an area model and then add the parts.</p> <table border="1" data-bbox="1568 821 2139 901"> <tr> <td></td> <td>100</td> <td>60</td> <td>3</td> </tr> <tr> <td>5</td> <td><math>100 \times 5 = 500</math></td> <td><math>60 \times 5 = 300</math></td> <td><math>3 \times 5 = 15</math></td> </tr> </table> <p>Use a column multiplication, including any required exchanges.</p> $\begin{array}{r} 136 \\ \times 5 \\ \hline 816 \\ \phantom{0}23 \end{array}$		100	60	3	5	$100 \times 5 = 500$	$60 \times 5 = 300$	$3 \times 5 = 15$
	H	T	O																																
1000		10 10 10 10 10	1 1 1																																
100		10 10 10 10 10	1 1 1																																
100		10 10 10 10 10	1 1 1																																
100		10 10 10 10 10	1 1 1																																
100		10 10 10 10 10	1 1 1																																
	100	60	3																																
5	$100 \times 5 = 500$	$60 \times 5 = 300$	$3 \times 5 = 15$																																

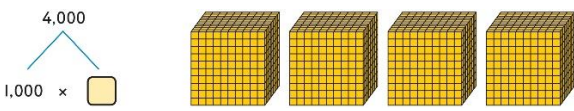
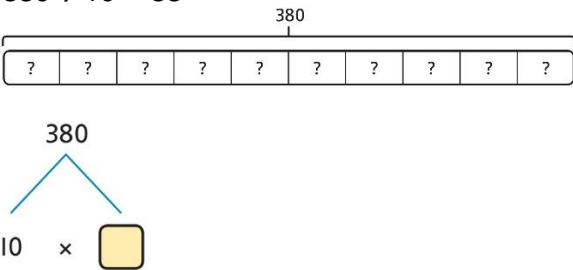
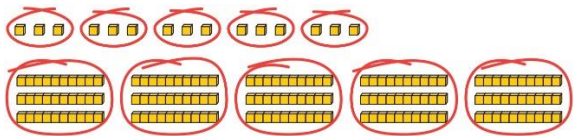
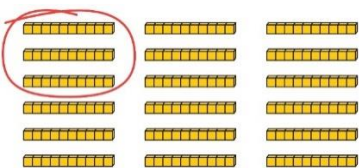
	Concrete	Pictorial	Abstract
<p><b>Multiplying 2-digit numbers by 2-digit numbers</b></p>	<p>Partition one number into 10s and 1s, then add the parts.</p> <p><math>23 \times 15 = ?</math></p>  <p><math>10 \times 15 = 150</math>      <math>10 \times 15 = 150</math></p> <p><math>3 \times 15 = 45</math></p> <p>There are 345 bottles of milk in total.</p> <p><math>23 \times 15 = 345</math></p> $\begin{array}{r} \text{H T O} \\ 150 \\ 150 \\ + 45 \\ \hline 345 \end{array}$	<p>Use an area model and add the parts.</p> <p><math>28 \times 15 = ?</math></p>  <p><math>20 \times 10 = 200 \text{ m}^2</math>      <math>8 \times 10 = 80 \text{ m}^2</math></p> <p><math>20 \times 5 = 100 \text{ m}^2</math>      <math>8 \times 5 = 40 \text{ m}^2</math></p> $\begin{array}{r} \text{H T O} \\ 200 \\ 100 \\ + 80 \\ + 40 \\ \hline 420 \end{array}$ <p><math>28 \times 15 = 420</math></p>	<p>Use column multiplication, ensuring understanding of place value at each stage.</p> $\begin{array}{r} 34 \\ \times 27 \\ \hline 238 \\ 680 \\ \hline 680 \end{array}$ <p><math>34 \times 7</math></p> <p><math>34 \times 20</math></p> $\begin{array}{r} 34 \\ \times 27 \\ \hline 238 \\ 680 \\ \hline 918 \end{array}$ <p><math>34 \times 7</math></p> <p><math>34 \times 20</math></p> <p><math>34 \times 27</math></p>
<p><b>Multiplying up to 4-digits by 2-digits</b></p>		<p>Use the area model then add the parts.</p>  <p><math>143 \times 12 = 1,716</math></p> <p>There are 1,716 boxes of cereal in total.</p> <p><math>143 \times 12 = 1,716</math></p> $\begin{array}{r} \text{Th H T O} \\ 1000 \\ 400 \\ 200 \\ 80 \\ 30 \\ + 6 \\ \hline 1716 \end{array}$	<p>Use column multiplication, ensuring understanding of place value at each stage.</p> $\begin{array}{r} 143 \\ \times 12 \\ \hline 286 \\ 1430 \\ \hline 1716 \end{array}$ <p><math>143 \times 2</math></p> <p><math>143 \times 10</math></p> <p><math>143 \times 12</math></p> <p>Progress to include examples that require multiple exchanges as understanding, confidence and fluency build.</p> <p><math>1,274 \times 32 = ?</math></p>

Year 5

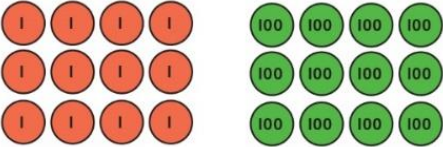
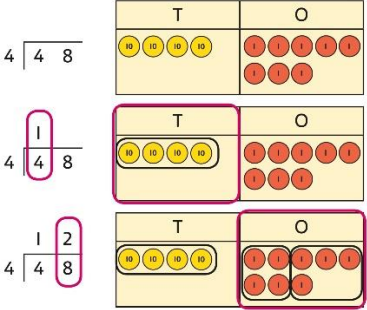
	Concrete	Pictorial	Abstract
			<p>First multiply 1,274 by 2.</p> $\begin{array}{r} 1\ 2\ 7\ 4 \\ \times \quad 3\ 2 \\ \hline 2\ 5\ 4\ 8 \end{array} \quad 1,274 \times 2$ <hr/> <p>Then multiply 1,274 by 30.</p> $\begin{array}{r} 1\ 2\ 7\ 4 \\ \times \quad 3\ 2 \\ \hline 2\ 5\ 4\ 8 \quad 1,274 \times 2 \\ 3\ 8\ 2\ 2\ 0 \quad 1,274 \times 30 \\ \hline \end{array}$ <hr/> <p>Finally, find the total.</p> $\begin{array}{r} 1\ 2\ 7\ 4 \\ \times \quad 3\ 2 \\ \hline 2\ 5\ 4\ 8 \quad 1,274 \times 2 \\ 3\ 8\ 2\ 2\ 0 \quad 1,274 \times 30 \\ \hline 4\ 0\ 7\ 6\ 8 \quad 1,274 \times 32 \end{array}$ <hr/> $1,274 \times 32 = 40,768$
<p><b>Multiplying decimals by 10, 100 and 1,000</b></p>	<p>Use place value equipment to explore and understand the exchange of 10 tenths, 10 hundredths or 10 thousandths.</p>	<p>Represent multiplication by 10 as exchange on a place value grid.</p>  <p><math>0.14 \times 10 = 1.4</math></p>	<p>Understand how this exchange is represented on a place value chart.</p>  <p><math>2.5 \times 10 = 25</math>  <math>2.5 \times 100 = 250</math>  <math>2.5 \times 1,000 = 2,500</math></p>

Year 5

	Concrete	Pictorial	Abstract
<b>Year 5 Division</b>			
<b>Understanding factors and prime numbers</b>	<p>Use equipment to explore the factors of a given number.</p>  <p><math>24 \div 3 = 8</math>  <math>24 \div 8 = 3</math>  <i>8 and 3 are factors of 24 because they divide 24 exactly.</i></p> <p><math>24 \div 5 = 4</math> remainder 4.</p>  <p><i>5 is not a factor of 24 because there is a remainder.</i></p>	<p>Understand that prime numbers are numbers with exactly two factors.</p> <p><math>13 \div 1 = 13</math>  <math>13 \div 2 = 6 \text{ r } 1</math>  <math>13 \div 4 = 4 \text{ r } 1</math></p> <p><i>1 and 13 are the only factors of 13. 13 is a prime number.</i></p>	<p>Understand how to recognise prime and composite numbers.</p> <p><i>I know that 31 is a prime number because it can be divided by only 1 and itself without leaving a remainder.</i></p> <p><i>I know that 33 is not a prime number as it can be divided by 1, 3, 11 and 33.</i></p> <p><i>I know that 1 is not a prime number, as it has only 1 factor.</i></p>
<b>Understanding inverse operations and the link with multiplication, grouping and sharing</b>	<p>Use equipment to group and share and to explore the calculations that are present.</p> <p><i>I have 28 counters.</i></p> <p><i>I made 7 groups of 4. There are 28 in total.</i></p> <p><i>I have 28 in total. I shared them equally into 7 groups. There are 4 in each group.</i></p> <p><i>I have 28 in total. I made groups of 4. There are 7 equal groups.</i></p>	<p>Represent multiplicative relationships and explore the families of division facts.</p>  <p><math>60 \div 4 = 15</math>  <math>60 \div 15 = 4</math></p>	<p>Represent the different multiplicative relationships to solve problems requiring inverse operations.</p> <p><math>12 \div 3 = \square</math>  <math>12 \div \square = 3</math>  <math>\square \times 3 = 12</math>  <math>\square \div 3 = 12</math></p>  <p>Understand missing number problems for division calculations and know how to solve them using inverse operations.</p> <p><math>22 \div ? = 2</math>  <math>22 \div 2 = ?</math>  <math>? \div 2 = 22</math>  <math>? \div 22 = 2</math></p>


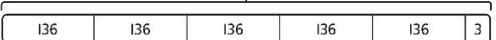
	Concrete	Pictorial	Abstract								
<p><b>Dividing whole numbers by 10, 100 and 1,000</b></p>	<p>Use place value equipment to support unitising for division.</p> <p><math>4,000 \div 1,000</math></p>  <p><math>4,000</math> is 4 thousands.</p> <p><math>4 \times 1,000 = 4,000</math></p> <p>So, <math>4,000 \div 1,000 = 4</math></p>	<p>Use a bar model to support dividing by unitising.</p> <p><math>380 \div 10 = 38</math></p>  <p><math>380</math> is 38 tens.</p> <p><math>38 \times 10 = 380</math></p> <p><math>10 \times 38 = 380</math></p> <p>So, <math>380 \div 10 = 38</math></p>	<p>Understand how and why the digits change on a place value grid when dividing by 10, 100 or 1,000.</p> <table border="1" data-bbox="1579 367 2004 454"> <thead> <tr> <th>Th</th> <th>H</th> <th>T</th> <th>O</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>2</td> <td>0</td> <td>0</td> </tr> </tbody> </table> <p><math>3,200 \div 100 = ?</math></p> <p><math>3,200</math> is 3 thousands and 2 hundreds.</p> <p><math>200 \div 100 = 2</math></p> <p><math>3,000 \div 100 = 30</math></p> <p><math>3,200 \div 100 = 32</math></p> <p>So, the digits will move two places to the right.</p>	Th	H	T	O	3	2	0	0
Th	H	T	O								
3	2	0	0								
<p><b>Dividing by multiples of 10, 100 and 1,000</b></p>	<p>Use place value equipment to represent known facts and unitising.</p>  <p>15 ones put into groups of 3 ones. There are 5 groups.</p> <p><math>15 \div 3 = 5</math></p> <p>15 tens put into groups of 3 tens. There are 5 groups.</p> <p><math>150 \div 30 = 5</math></p>	<p>Represent related facts with place value equipment when dividing by unitising.</p>  <p>180 is 18 tens.</p> <p>18 tens divided into groups of 3 tens. There are 6 groups.</p> <p><math>180 \div 30 = 6</math></p>	<p>Reason from known facts, based on understanding of unitising. Use knowledge of the inverse relationship to check.</p> <p><math>3,000 \div 5 = 600</math></p> <p><math>3,000 \div 50 = 60</math></p> <p><math>3,000 \div 500 = 6</math></p> <p><math>5 \times 600 = 3,000</math></p> <p><math>50 \times 60 = 3,000</math></p> <p><math>500 \times 6 = 3,000</math></p>								

Year 5

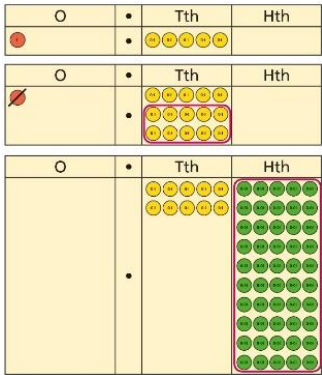
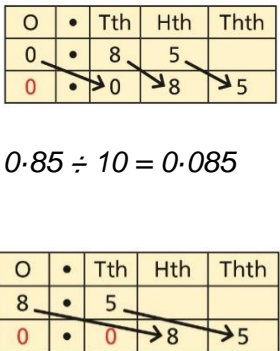
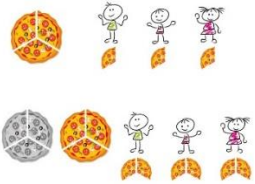

	Concrete	Pictorial	Abstract
		 <p>12 ones divided into groups of 4. There are 3 groups.</p> <p>12 hundreds divided into groups of 4 hundreds. There are 3 groups.</p> <p><math>1200 \div 400 = 3</math></p>	
<p><b>Dividing up to four digits by a single digit using short division</b></p>	<p>Explore grouping using place value equipment.</p> <p><math>268 \div 2 = ?</math></p> <p><i>There is 1 group of 2 hundreds. There are 3 groups of 2 tens. There are 4 groups of 2 ones.</i></p> <p><math>264 \div 2 = 134</math></p>	<p>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.</p>  <p>Lay out the problem as a short division.</p> <p><i>There is 1 group of 4 in 4 tens. There are 2 groups of 4 in 8 ones.</i></p> <p>Work with divisions that require exchange.</p>	<p>Use short division for up to 4-digit numbers divided by a single digit.</p> $  \begin{array}{r}  0 \ 5 \ 5 \ 6 \\  7 \overline{) 3 \ 8 \ 3 \ 9 \ 4 \ 2}  \end{array}  $ <p><math>3,892 \div 7 = 556</math></p> <p>Use multiplication to check.</p> <p><math>556 \times 7 = ?</math></p> <p><math>6 \times 7 = 42</math>  <math>50 \times 7 = 350</math>  <math>500 \times 7 = 3500</math></p> <p><math>3,500 + 350 + 42 = 3,892</math></p>



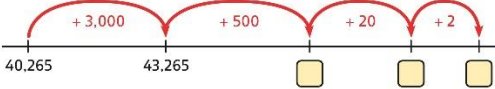
	Concrete	Pictorial	Abstract																
		<div style="display: flex; flex-direction: column; align-items: flex-start;"> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <math>4 \overline{) 92}</math> <div style="margin-left: 10px;"> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><th>T</th><th>O</th></tr> <tr><td>10 10 10 10 10</td><td>20</td></tr> </table> </div> <div style="margin-left: 10px;"> <p>First, lay out the problem.</p> </div> </div> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <math>4 \overline{) 92} \begin{matrix} 2 \\ \hline \end{matrix}</math> <div style="margin-left: 10px;"> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><th>T</th><th>O</th></tr> <tr><td>10 10 10 10</td><td>20</td></tr> </table> </div> <div style="margin-left: 10px;"> <p>How many groups of 4 go into 9 tens? 2 groups of 4 tens with 1 ten left over.</p> </div> </div> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <math>4 \overline{) 92} \begin{matrix} 2 \\ \hline 2 \\ \hline \end{matrix}</math> <div style="margin-left: 10px;"> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><th>T</th><th>O</th></tr> <tr><td>10 10 10 10</td><td>20 20</td></tr> </table> </div> <div style="margin-left: 10px;"> <p>Exchange the 1 ten left over for 10 ones. We now have 12 ones.</p> </div> </div> <div style="display: flex; align-items: center;"> <math>4 \overline{) 92} \begin{matrix} 2 \\ \hline 3 \\ \hline \end{matrix}</math> <div style="margin-left: 10px;"> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><th>T</th><th>O</th></tr> <tr><td>10 10 10</td><td>20 20 20</td></tr> </table> </div> <div style="margin-left: 10px;"> <p>How many groups of 4 go into 12 ones? 3 groups of 4 ones.</p> </div> </div> </div>	T	O	10 10 10 10 10	20	T	O	10 10 10 10	20	T	O	10 10 10 10	20 20	T	O	10 10 10	20 20 20	
T	O																		
10 10 10 10 10	20																		
T	O																		
10 10 10 10	20																		
T	O																		
10 10 10 10	20 20																		
T	O																		
10 10 10	20 20 20																		

<p><b>Understanding remainders</b></p> <p>Understand remainders using concrete versions of a problem.</p> <p><i>80 cakes divided into trays of 6.</i></p>  <p><i>80 cakes in total. They make 13 groups of 6, with 2 remaining.</i></p>	<p>Use short division and understand remainders as the last remaining 1s.</p> <div style="display: flex; flex-direction: column; align-items: flex-start;"> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <math>6 \overline{) 80}</math> <div style="margin-left: 10px;"> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><th>T</th><th>O</th></tr> <tr><td>10 10 10 10</td><td></td></tr> </table> </div> <div style="margin-left: 10px;"> <p>Lay out the problem as short division.</p> </div> </div> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <math>6 \overline{) 80} \begin{matrix} 1 \\ \hline \end{matrix}</math> <div style="margin-left: 10px;"> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><th>T</th><th>O</th></tr> <tr><td>10 10 10</td><td></td></tr> </table> </div> <div style="margin-left: 10px;"> <p>How many groups of 6 go into 8 tens? There is 1 group of 6 tens. There are 2 tens remaining.</p> </div> </div> <div style="display: flex; align-items: center;"> <math>6 \overline{) 80} \begin{matrix} 1 \\ \hline 3 \text{ r } 2 \\ \hline \end{matrix}</math> <div style="margin-left: 10px;"> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><th>T</th><th>O</th></tr> <tr><td>10 10 10</td><td>20 20 20</td></tr> </table> </div> <div style="margin-left: 10px;"> <p>How many groups of 6 go into 20 ones? There are 3 groups of 6 ones. There are 2 ones remaining.</p> </div> </div> </div>	T	O	10 10 10 10		T	O	10 10 10		T	O	10 10 10	20 20 20	<p>In problem solving contexts, represent divisions including remainders with a bar model.</p> <div style="text-align: center; margin: 10px 0;"> <math>683</math>   </div> <p><math>683 = 136 \times 5 + 3</math>  <math>683 \div 5 = 136 \text{ r } 3</math></p>
T	O													
10 10 10 10														
T	O													
10 10 10														
T	O													
10 10 10	20 20 20													



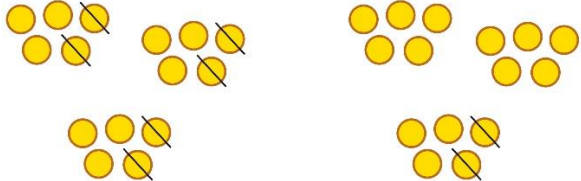
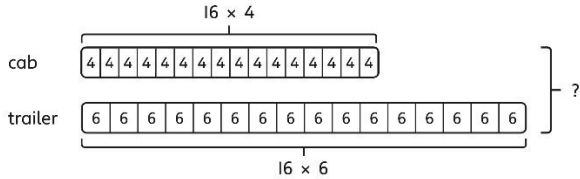
Year 5

	Concrete	Pictorial	Abstract
<p><b>Dividing decimals by 10, 100 and 1,000</b></p>	<p>Understand division by 10 using exchange.</p> <p><i>2 ones are 20 tenths.</i></p> <p><i>20 tenths divided by 10 is 2 tenths.</i></p>	<p>Represent division using exchange on a place value grid.</p>  <p><i>1.5 is 1 one and 5 tenths.</i>  <i>This is equivalent to 10 tenths and 50 hundredths.</i>  <i>10 tenths divided by 10 is 1 tenth.</i>  <i>50 hundredths divided by 10 is 5 hundredths.</i>  <i>1.5 divided by 10 is 1 tenth and 5 hundredths.</i>  <math>1.5 \div 10 = 0.15</math></p>	<p>Understand the movement of digits on a place value grid.</p>  <p><math>0.85 \div 10 = 0.085</math></p> <p><math>8.5 \div 100 = 0.085</math></p>
<p><b>Understanding the relationship between fractions and division</b></p>	<p>Use sharing to explore the link between fractions and division.</p> <p><i>1 whole shared between 3 people.</i>  <i>Each person receives one-third.</i></p> 	<p>Use a bar model and other fraction representations to show the link between fractions and division.</p>  <p><math>1 \div 3 = \frac{1}{3}</math></p>	<p>Use the link between division and fractions to calculate divisions.</p> <p><math>5 \div 4 = \frac{5}{4} = 1\frac{1}{4}</math></p> <p><math>11 \div 4 = \frac{11}{4} = 2\frac{3}{4}</math></p>

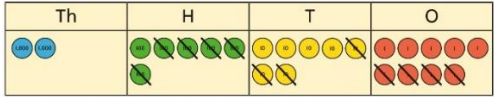
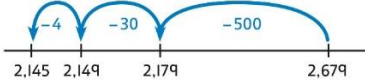
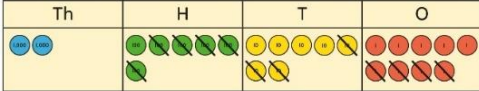
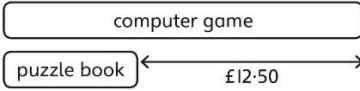
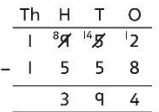
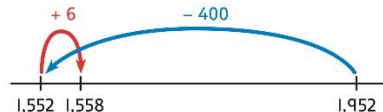
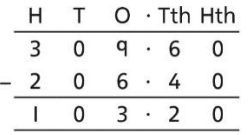
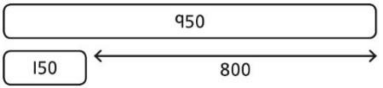
Year 6

	Concrete	Pictorial	Abstract																																																																																																																																							
<b>Year 6 Addition</b>																																																																																																																																										
<b>Comparing and selecting efficient methods</b>	<p>Represent 7-digit numbers on a place value grid, and use this to support thinking and mental methods.</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td>M</td> <td>HTh</td> <td>TTh</td> <td>Th</td> <td>H</td> <td>T</td> <td>O</td> </tr> <tr> <td>●●</td> <td>●●●●</td> <td>●</td> <td>●</td> <td>●●●</td> <td></td> <td>●</td> </tr> </table>	M	HTh	TTh	Th	H	T	O	●●	●●●●	●	●	●●●		●	<p>Discuss similarities and differences between methods, and choose efficient methods based on the specific calculation. Compare written and mental methods alongside place value representations.</p>  <table border="1" style="width: 100%; text-align: center;"> <tr> <td>TTh</td> <td>Th</td> <td>H</td> <td>T</td> <td>O</td> </tr> <tr> <td>●●●●</td> <td></td> <td>●●</td> <td>●●●●</td> <td>●●●●</td> </tr> <tr> <td></td> <td>●●</td> <td>●●●●</td> <td>●●</td> <td>●●</td> </tr> </table> <table style="margin-left: auto; margin-right: 0;"> <tr> <td>TTh</td> <td>Th</td> <td>H</td> <td>T</td> <td>O</td> </tr> <tr> <td>4</td> <td>0</td> <td>2</td> <td>6</td> <td>5</td> </tr> <tr> <td>+</td> <td>3</td> <td>5</td> <td>2</td> <td>2</td> </tr> <tr> <td colspan="5"><hr/></td> </tr> </table>	TTh	Th	H	T	O	●●●●		●●	●●●●	●●●●		●●	●●●●	●●	●●	TTh	Th	H	T	O	4	0	2	6	5	+	3	5	2	2	<hr/>					<p>Use column addition where mental methods are not efficient. Recognise common errors with column addition.</p> <p><math>32,145 + 4,302 = ?</math></p> <table style="display: inline-table; margin-right: 20px;"> <tr> <td>TTh</td> <td>Th</td> <td>H</td> <td>T</td> <td>O</td> </tr> <tr> <td>3</td> <td>2</td> <td>1</td> <td>4</td> <td>5</td> </tr> <tr> <td>+</td> <td>4</td> <td>3</td> <td>0</td> <td>2</td> </tr> <tr> <td colspan="5"><hr/></td> </tr> <tr> <td>3</td> <td>6</td> <td>4</td> <td>4</td> <td>7</td> </tr> </table> <table style="display: inline-table;"> <tr> <td>TTh</td> <td>Th</td> <td>H</td> <td>T</td> <td>O</td> </tr> <tr> <td>3</td> <td>2</td> <td>1</td> <td>4</td> <td>5</td> </tr> <tr> <td>+</td> <td>4</td> <td>3</td> <td>0</td> <td>2</td> </tr> <tr> <td colspan="5"><hr/></td> </tr> <tr> <td>7</td> <td>5</td> <td>1</td> <td>6</td> <td>5</td> </tr> </table> <p><i>Which method has been completed accurately?</i></p> <p><i>What mistake has been made?</i></p> <p>Column methods are also used for decimal additions where mental methods are not efficient.</p> <table style="margin-left: auto; margin-right: 0;"> <tr> <td>H</td> <td>T</td> <td>O</td> <td>·</td> <td>Tth</td> <td>Hth</td> </tr> <tr> <td>1</td> <td>4</td> <td>0</td> <td>·</td> <td>0</td> <td>9</td> </tr> <tr> <td>+</td> <td>4</td> <td>9</td> <td>·</td> <td>8</td> <td>9</td> </tr> <tr> <td colspan="6"><hr/></td> </tr> <tr> <td>1</td> <td>8</td> <td>9</td> <td>·</td> <td>9</td> <td>8</td> </tr> <tr> <td colspan="6" style="text-align: center;"> </td> </tr> </table>	TTh	Th	H	T	O	3	2	1	4	5	+	4	3	0	2	<hr/>					3	6	4	4	7	TTh	Th	H	T	O	3	2	1	4	5	+	4	3	0	2	<hr/>					7	5	1	6	5	H	T	O	·	Tth	Hth	1	4	0	·	0	9	+	4	9	·	8	9	<hr/>						1	8	9	·	9	8						
M	HTh	TTh	Th	H	T	O																																																																																																																																				
●●	●●●●	●	●	●●●		●																																																																																																																																				
TTh	Th	H	T	O																																																																																																																																						
●●●●		●●	●●●●	●●●●																																																																																																																																						
	●●	●●●●	●●	●●																																																																																																																																						
TTh	Th	H	T	O																																																																																																																																						
4	0	2	6	5																																																																																																																																						
+	3	5	2	2																																																																																																																																						
<hr/>																																																																																																																																										
TTh	Th	H	T	O																																																																																																																																						
3	2	1	4	5																																																																																																																																						
+	4	3	0	2																																																																																																																																						
<hr/>																																																																																																																																										
3	6	4	4	7																																																																																																																																						
TTh	Th	H	T	O																																																																																																																																						
3	2	1	4	5																																																																																																																																						
+	4	3	0	2																																																																																																																																						
<hr/>																																																																																																																																										
7	5	1	6	5																																																																																																																																						
H	T	O	·	Tth	Hth																																																																																																																																					
1	4	0	·	0	9																																																																																																																																					
+	4	9	·	8	9																																																																																																																																					
<hr/>																																																																																																																																										
1	8	9	·	9	8																																																																																																																																					

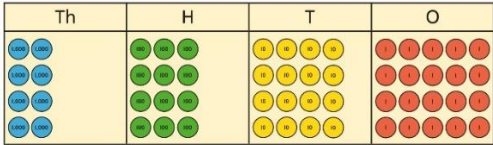
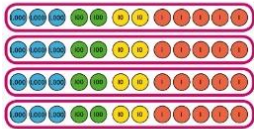
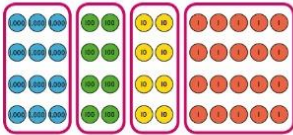
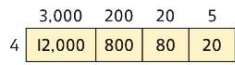
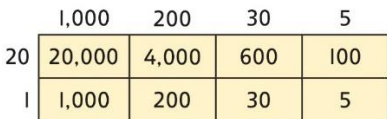
Year 6

	Concrete	Pictorial	Abstract
<p><b>Selecting mental methods for larger numbers where appropriate</b></p>	<p>Represent 7-digit numbers on a place value grid, and use this to support thinking and mental methods.</p>  <p><math>2,411,301 + 500,000 = ?</math></p> <p><i>This would be 5 more counters in the HTh place.</i></p> <p><i>So, the total is 2,911,301.</i></p> <p><math>2,411,301 + 500,000 = 2,911,301</math></p>	<p>Use a bar model to support thinking in addition problems.</p> <p><math>257,000 + 99,000 = ?</math></p>  <p><i>I added 100 thousands then subtracted 1 thousand.</i></p> <p><math>257 \text{ thousands} + 100 \text{ thousands} = 357 \text{ thousands}</math></p> <p><math>257,000 + 100,000 = 357,000</math>  <math>357,000 - 1,000 = 356,000</math></p> <p><i>So, <math>257,000 + 99,000 = 356,000</math></i></p>	<p>Use place value and unitising to support mental calculations with larger numbers.</p> <p><math>195,000 + 6,000 = ?</math></p> <p><math>195 + 5 + 1 = 201</math></p> <p><i>195 thousands + 6 thousands = 201 thousands</i></p> <p><i>So, <math>195,000 + 6,000 = 201,000</math></i></p>
<p><b>Understanding order of operations in calculations</b></p>	<p>Use equipment to model different interpretations of a calculation with more than one operation. Explore different results.</p> <p><math>3 \times 5 - 2 = ?</math></p>  <p> <math display="block">\begin{array}{r} 3 \times (5 - 2) \\ \downarrow \quad \downarrow \\ 3 \times 3 = 9 \end{array}</math> </p> <p> <math display="block">\begin{array}{r} (3 \times 5) - 2 \\ \downarrow \quad \downarrow \\ 15 - 2 = 13 \end{array}</math> </p>	<p>Model calculations using a bar model to demonstrate the correct order of operations in multi-step calculations.</p>  <p>This can be written as: <math>16 \times 4 + 16 \times 6</math></p> <p><math>64 + 96 = 160</math></p>	<p>Understand the correct order of operations in calculations without brackets including that both addition &amp; subtraction and multiplication &amp; division carry equal weight (i.e. should be calculated in the order they appear in a number sentence).</p> <p>Understand how brackets affect the order of operations in a calculation.</p> <p><math>4 + 6 \times 16</math>  <math>4 + 96 = 100</math>  <math>(4 + 6) \times 16</math>  <math>10 \times 16 = 160</math></p> <p>Children should be able to recall the acronym BIDMAS and understand it.</p>

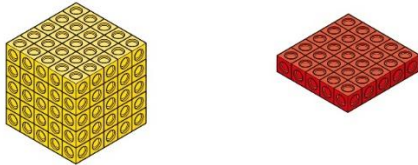
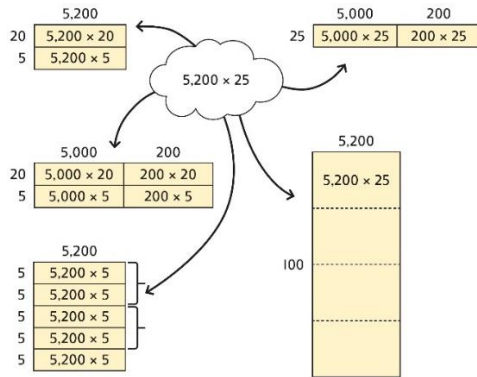
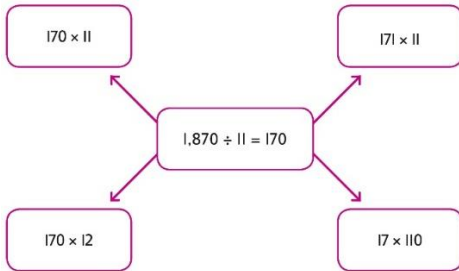
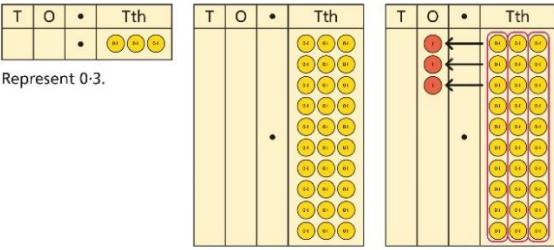
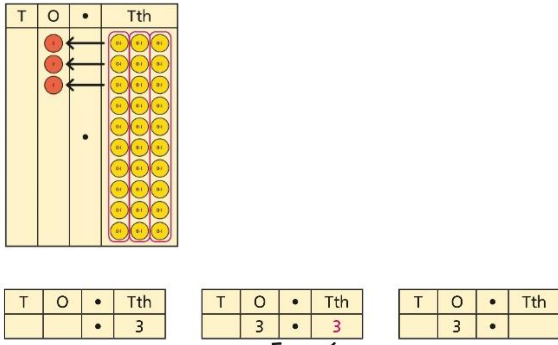
Year 6

	Concrete	Pictorial	Abstract
<b>Year 6 Subtraction</b>			
<b>Comparing and selecting efficient methods</b>	<p>Use counters on a place value grid to represent subtractions of larger numbers.</p> 	<p>Compare subtraction methods alongside place value representations.</p>   $\begin{array}{r} \text{Th} \quad \text{H} \quad \text{T} \quad \text{O} \\ 2 \quad 6 \quad 7 \quad 9 \\ - \quad 5 \quad 3 \quad 4 \\ \hline 2 \quad 1 \quad 4 \quad 5 \end{array}$ <p>Use a bar model to represent calculations, including 'find the difference' with two bars as comparison.</p> 	<p>Compare and select methods. Use column subtraction when mental methods are not efficient. Use two different methods for one calculation as a checking strategy.</p>   <p>Use column subtraction for decimal problems, including in the context of measure.</p> 
<b>Subtracting mentally with larger numbers</b>		<p>Use a bar model to show how unitising can support mental calculations.</p> <p><math>950,000 - 150,000</math> That is 950 thousands - 150 thousands</p>  <p>So, the difference is 800 thousands. <math>950,000 - 150,000 = 800,000</math></p>	<p>Subtract efficiently from powers of 10.</p> <p><math>10,000 - 500 = ?</math></p>

Year 6

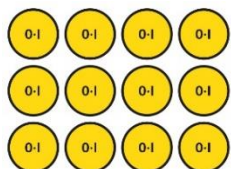
	Concrete	Pictorial	Abstract
<b>Year 6 Multiplication</b>			
<b>Multiplying up to a 4-digit number by a single digit number</b>	<p>Use equipment to explore multiplications.</p>  <p>4 groups of 2,345</p> <p>This is a multiplication:</p> $4 \times 2,345$ $2,345 \times 4$	<p>Use place value equipment to compare methods.</p> <p><b>Method 1</b></p>  $\begin{array}{r} 3\ 2\ 2\ 5 \\ 3\ 2\ 2\ 5 \\ 3\ 2\ 2\ 5 \\ 3\ 2\ 2\ 5 \\ + \\ \hline 1\ 2\ 9\ 0\ 0 \\ \phantom{1}\ 1\ 2 \end{array}$ <p><b>Method 2</b></p>  $4 \times 3,000 + 4 \times 200 + 4 \times 20 + 4 \times 5$ $12,000 + 800 + 80 + 20 = 12,900$	<p>Understand area model and short multiplication.</p> <p>Compare and select appropriate methods for specific multiplications.</p> <p><b>Method 3</b></p>  $12,000 + 800 + 80 + 20 = 12,900$ <p><b>Method 4</b></p> $\begin{array}{r} 3\ 2\ 2\ 5 \\ \times \phantom{0}\ 4 \\ \hline 1\ 2\ 9\ 0\ 0 \\ \phantom{1}\ 1\ 2 \end{array}$
<b>Multiplying up to a 4-digit number by a 2-digit number</b>		<p>Use an area model alongside written multiplication.</p> <p><b>Method 1</b></p>  $\begin{array}{r} 1\ 2\ 3\ 5 \\ \times \phantom{0}\ 2\ 1 \\ \hline 5\ 1 \times 5 \\ 3\ 0\ 1 \times 30 \\ 2\ 0\ 0\ 1 \times 200 \\ 1\ 0\ 0\ 0\ 1 \times 1,000 \\ 1\ 0\ 0\ 20 \times 5 \\ 6\ 0\ 0\ 20 \times 30 \\ 4\ 0\ 0\ 0\ 20 \times 200 \\ 2\ 0\ 0\ 0\ 0\ 20 \times 1,000 \\ \hline 2\ 5\ 9\ 3\ 5\ 21 \times 1,235 \end{array}$	<p>Use compact column multiplication with understanding of place value at all stages.</p> $\begin{array}{r} 1\ 2\ 3\ 5 \\ \times \phantom{0}\ 2\ 1 \\ \hline 1\ 2\ 3\ 5\ 1 \times 1,235 \\ 2\ 4\ 7\ 0\ 0\ 20 \times 1,235 \\ \hline 2\ 5\ 9\ 3\ 5\ 21 \times 1,235 \end{array}$



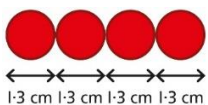
	Concrete	Pictorial	Abstract
<p><b>Using knowledge of factors and partitions to compare methods for multiplications</b></p>	<p>Use equipment to understand square numbers and cube numbers.</p>  <p><math>5 \times 5 = 5^2 = 25</math>  <math>5 \times 5 \times 5 = 5^3 = 25 \times 5 = 125</math></p>	<p>Compare methods visually using an area model. Understand that multiple approaches will produce the same answer if completed accurately.</p>  <p>Represent and compare methods using a bar model.</p>	<p>Use a known fact to generate families of related facts.</p>  <p>Use factors to calculate efficiently.</p> <p><math>15 \times 16</math>  <math>= 3 \times 5 \times 2 \times 8</math>  <math>= 3 \times 8 \times 2 \times 5</math>  <math>= 24 \times 10</math>  <math>= 240</math></p>
<p><b>Multiplying by 10, 100 and 1,000</b></p>	<p>Use place value equipment to explore exchange in decimal multiplication.</p>  <p><math>0.3 \times 10 = ?</math>  <math>0.3</math> is 3 tenths.  <math>10 \times 3</math> tenths are 30 tenths.  <math>30</math> tenths are equivalent to 3 ones.</p>	<p>Understand how the exchange affects decimal numbers on a place value grid.</p>  <p><math>0.3 \times 10 = 3</math></p>	<p>Use knowledge of multiplying by 10, 100 and 1,000 to multiply by multiples of 10, 100 and 1,000.</p> <p><math>8 \times 100 = 800</math>  <math>8 \times 300 = 800 \times 3</math>  <math>= 2,400</math></p> <p><math>2.5 \times 10 = 25</math>  <math>2.5 \times 20 = 2.5 \times 10 \times 2</math>  <math>= 50</math></p>

**Multiplying decimals**

Explore decimal multiplications using place value equipment and in the context of measures.



3 groups of 4 tenths is 12 tenths.  
4 groups of 3 tenths is 12 tenths.



$4 \times 1 \text{ cm} = 4 \text{ cm}$   
 $4 \times 0.3 \text{ cm} = 1.2 \text{ cm}$   
 $4 \times 1.3 = 4 + 1.2 = 5.2 \text{ cm}$

**Pictorial**

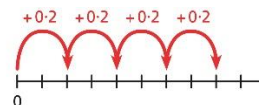
Represent calculations on a place value grid.

$3 \times 3 = 9$   
 $3 \times 0.3 = 0.9$

T	O	•	Tth									
			<table border="1"> <tr><td>0.1</td><td>0.1</td><td>0.1</td></tr> <tr><td>0.1</td><td>0.1</td><td>0.1</td></tr> <tr><td>0.1</td><td>0.1</td><td>0.1</td></tr> </table>	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.1	0.1	0.1										
0.1	0.1	0.1										
0.1	0.1	0.1										

Understand the link between multiplying decimals and repeated addition.

T	O	•	Tth				
			<table border="1"> <tr><td>0.1</td><td>0.1</td></tr> <tr><td>0.1</td><td>0.1</td></tr> </table>	0.1	0.1	0.1	0.1
0.1	0.1						
0.1	0.1						



**Abstract**

Use known facts to multiply decimals.

$4 \times 3 = 12$   
 $4 \times 0.3 = 1.2$   
 $4 \times 0.03 = 0.12$

$20 \times 5 = 100$   
 $20 \times 0.5 = 10$   
 $20 \times 0.05 = 1$

Find families of facts from a known multiplication.

*I know that  $18 \times 4 = 72$ .*

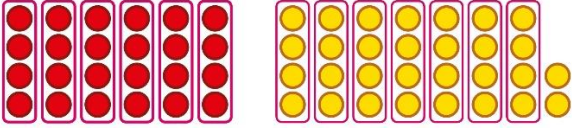
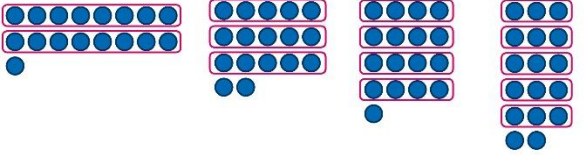
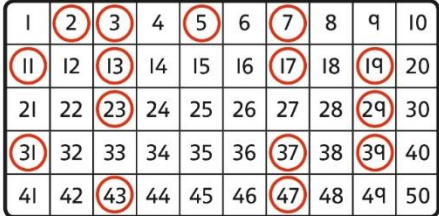
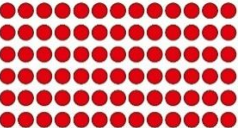
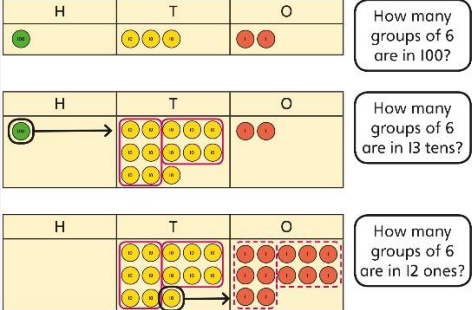
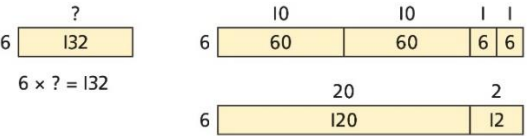
*This can help me work out:*

$1.8 \times 4 = ?$   
 $18 \times 0.4 = ?$   
 $180 \times 0.4 = ?$   
 $18 \times 0.04 = ?$


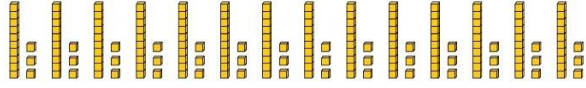
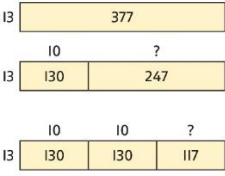
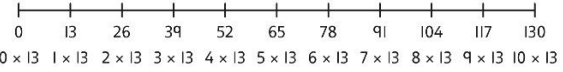
Use a place value grid to understand the effects of multiplying decimals.

	H	T	O	•	Tth	Hth
$2 \times 3$			6	•		
$0.2 \times 3$			0	•	6	
$0.02 \times 3$				•		

Year 6

	Concrete	Pictorial	Abstract
<b>Year 6 Division</b>			
<b>Understanding factors</b>	<p>Use equipment to explore different factors of a number.</p>  <p><math>24 \div 4 = 6</math>      <math>30 \div 4 = 7 \text{ remainder } 2</math></p> <p><i>4 is a factor of 24 but is not a factor of 30.</i></p>	<p>Recognise prime numbers as numbers having exactly two factors. Understand the link with division and remainders.</p>  <p><math>17 \div 2 = 8 \text{ r } 1</math>      <math>17 \div 3 = 5 \text{ r } 2</math>      <math>17 \div 4 = 4 \text{ r } 1</math>      <math>17 \div 5 = 3 \text{ r } 2</math></p>	<p>Recognise and know primes up to 100. Understand that 2 is the only even prime, and that 1 is not a prime number.</p> 
<b>Dividing by a single digit</b>	<p>Use equipment to make groups from a total.</p>  <p><i>There are 78 in total. There are 6 groups of 13. There are 13 groups of 6.</i></p>	 <p>How many groups of 6 are in 100?      <math>6 \overline{) 100} \begin{matrix} 0 \\ 16 \\ 32 \end{matrix}</math></p> <p>How many groups of 6 are in 13 tens?      <math>6 \overline{) 132} \begin{matrix} 0 &amp; 2 \\ 18 &amp; 2 \end{matrix}</math></p> <p>How many groups of 6 are in 12 ones?      <math>6 \overline{) 132} \begin{matrix} 0 &amp; 2 &amp; 2 \\ 18 &amp; 2 &amp; 2 \end{matrix}</math></p>	<p>Use short division to divide by a single digit.</p> $\begin{array}{r} 0 \\ 6 \overline{) 132} \end{array}$ $\begin{array}{r} 0 & 2 \\ 6 \overline{) 132} \end{array}$ $\begin{array}{r} 0 & 2 & 2 \\ 6 \overline{) 132} \end{array}$ $\begin{array}{r} 0 & 2 & 2 \\ 6 \overline{) 132} \end{array}$ <p>Use an area model to link multiplication and division.</p>  <p><math>6 \times ? = 132</math></p> <p><math>132 = 120 + 12</math></p> <p><math>132 \div 6 = 20 + 2 = 22</math></p>

Year 6

	Concrete	Pictorial	Abstract
<p><b>Dividing by a 2-digit number using factors</b></p>	<p>Understand that division by factors can be used when dividing by a number that is not prime.</p>	<p>Use factors and repeated division.</p> $1,260 \div 14 = ?$  $1,260 \div 2 = 630$ $630 \div 7 = 90$ $1,260 \div 14 = 90$	<p>Use factors and repeated division where appropriate.</p> $2,100 \div 12 = ?$ $2,100 \rightarrow \boxed{\div 2} \rightarrow \boxed{\div 6} \rightarrow$ $2,100 \rightarrow \boxed{\div 6} \rightarrow \boxed{\div 2} \rightarrow$ $2,100 \rightarrow \boxed{\div 3} \rightarrow \boxed{\div 4} \rightarrow$ $2,100 \rightarrow \boxed{\div 4} \rightarrow \boxed{\div 3} \rightarrow$ $2,100 \rightarrow \boxed{\div 3} \rightarrow \boxed{\div 2} \rightarrow \boxed{\div 2} \rightarrow$
<p><b>Dividing by a 2-digit number using long division</b></p>	<p>Use equipment to build numbers from groups.</p>  <p>182 divided into groups of 13. There are 14 groups.</p>	<p>Use an area model alongside written division to model the process.</p> $377 \div 13 = ?$  $377 \div 13 = 29$	<p>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.</p> $377 \div 13 = ?$  $0 \quad 13 \quad 26 \quad 39 \quad 52 \quad 65 \quad 78 \quad 91 \quad 104 \quad 117 \quad 130$ $0 \times 13 \quad 1 \times 13 \quad 2 \times 13 \quad 3 \times 13 \quad 4 \times 13 \quad 5 \times 13 \quad 6 \times 13 \quad 7 \times 13 \quad 8 \times 13 \quad 9 \times 13 \quad 10 \times 13$ $13 \overline{) 377}$ $\begin{array}{r} 377 \\ - 130 \quad 10 \\ \hline 247 \\ - 130 \quad 10 \\ \hline 117 \\ - 117 \quad 9 \\ \hline 0 \end{array}$ $377 \div 13 = 29$ <p>A slightly different layout may be used, with the division completed above rather than at the side.</p>

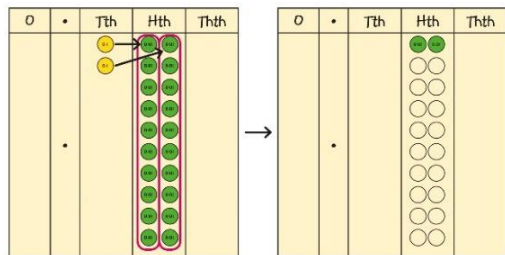
Concrete

Pictorial

Abstract

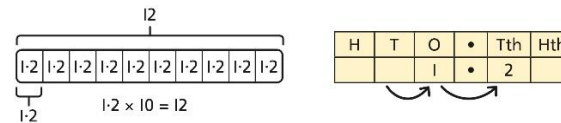
**Dividing by 10, 100 and 1,000**

Use place value equipment to explore division as exchange.



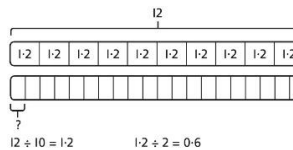
*0.2 is 2 tenths.  
2 tenths is equivalent to 20 hundredths.  
20 hundredths divided by 10 is 2 hundredths.*

Represent division to show the relationship with multiplication. Understand the effect of dividing by 10, 100 and 1,000 on the digits on a place value grid.



Understand how to divide using division by 10, 100 and 1,000.

$12 \div 20 = ?$



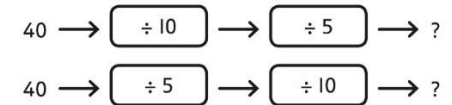
$$\begin{array}{r} 3 \\ 21 \overline{) 798} \\ - 630 \\ \hline 168 \end{array}$$

$$\begin{array}{r} 38 \\ 21 \overline{) 798} \\ - 630 \\ \hline 168 \\ - 168 \\ \hline 0 \end{array}$$

Divisions with a remainder explored in problem-solving contexts.

Use knowledge of factors to divide by multiples of 10, 100 and 1,000.

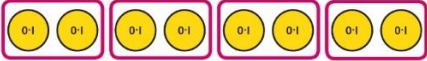
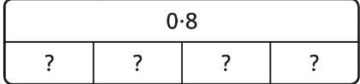
$40 \div 50 = \square$



$40 \div 5 = 8$   
 $8 \div 10 = 0.8$

So,  $40 \div 50 = 0.8$

Year 6

	Concrete	Pictorial	Abstract
<b>Dividing decimals</b>	<p>Use place value equipment to explore division of decimals.</p>  <p><i>8 tenths divided into 4 groups. 2 tenths in each group.</i></p>	<p>Use a bar model to represent divisions.</p>  <p><math>4 \times 2 = 8</math>                      <math>8 \div 4 = 2</math></p> <p>So, <math>4 \times 0.2 = 0.8</math>            <math>0.8 \div 4 = 0.2</math></p>	<p>Use short division to divide decimals with up to 2 decimal places.</p> $\begin{array}{r} 8 \overline{) 4.24} \\ \underline{4 \phantom{.} 2} \phantom{4} \\ 0 \phantom{.} \phantom{4} \\ 8 \overline{) 4.24} \\ \underline{4 \phantom{.} 2} \phantom{4} \\ 0 \phantom{.} 5 \\ 8 \overline{) 4.24} \\ \underline{4 \phantom{.} 2} \phantom{4} \\ 0 \phantom{.} 53 \\ 8 \overline{) 4.24} \end{array}$