

Oakwood Junior School

Maths and Calculation Policy

'Every child is a learner and can achieve'.



Written by:	Mrs Hughes
Approved by:	LGB
Date Approved:	30 th September 2024
Date of Review:	September 2026
Version:	2

Maths for all

Power Maths is used to develop children's mastery of mathematics through small steps of learning.

Live marking is used to ensure that early interventions take place to help all pupils develop at broadly the same pace.

Use of a variety of resources helps children to build a deep conceptual understanding.

Practice and consolidation through spiralling allows children to deepen and retain their understanding.

Adaptations through support rather than outcome ensure that all children progress through the curriculum at broadly the same pace.

Intelligent practice is used to develop procedural fluency.

Precise questioning is used to deepen understanding.

SEND in Maths

High Expectations for all

Developing relationships and knowing pupils well

Developing confidence, independence and resilience

Questioning and modelling for challenge

Engagement through hands on approach - CPA
Scaffolding learning



School Vision Statement

To celebrate excellence and achievement in ALL that WE do.

School Aims for pupils

Oakwood Junior School promotes high achievement and learning by working with children to:-

- become highly motivated to learn with an enquiring mind and a spirit of curiosity
- try their best to achieve high standards in all areas of the curriculum
- have high self-esteem by respecting and working well with others
- take pride in their work and be able to work independently and collaboratively
- look after their school and those in it – respecting themselves and the environment.

Maths Vision

We believe that every child can master an understanding and love of maths.

Maths Aims for Pupils For children to:

- Be able to visualise
- Be able to generalise
- Be able to communicate
- Have number sense (when the numbers speak to you)
- Have an understanding of their mathematical thinking (metacognition).

OWER KS2

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.

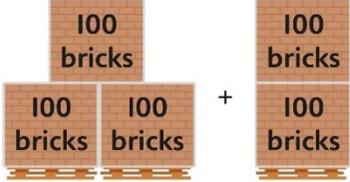
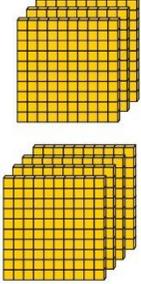
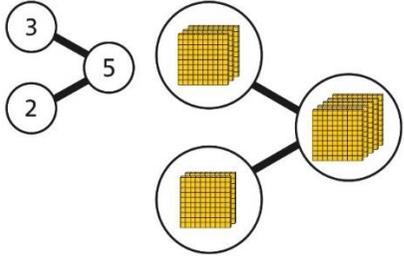
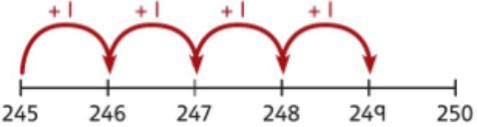
Fractions: Children develop the key concept of equivalent fractions, and link this with multiplying and dividing the numerators and denominators, as well as exploring the visual concept through fractions of shapes. Children learn how to find a fraction of an amount and develop this with the aid of a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

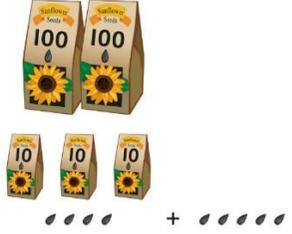
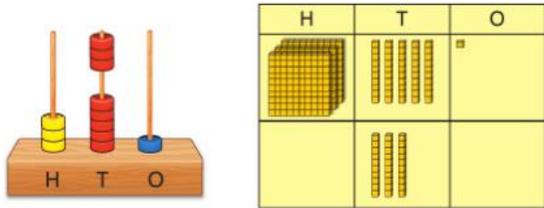
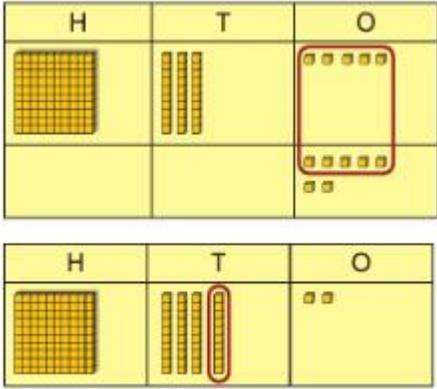
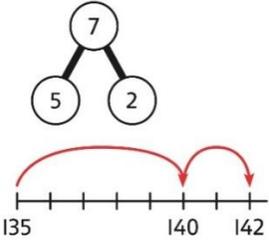
in Year 3, children develop an understanding of how to add and subtract fractions with the same denominator and find complements to the whole. This is developed alongside an understanding of fractions as numbers, including fractions greater than 1. In Year 4, children begin to work with fractions greater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

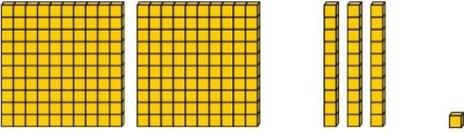
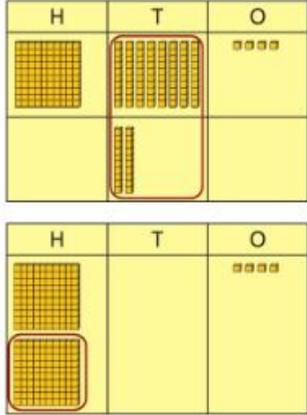
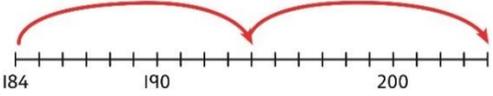
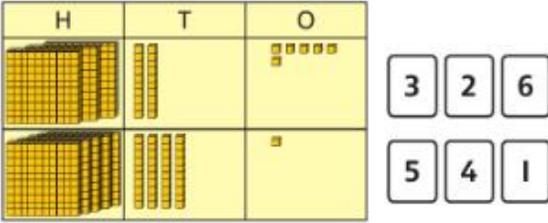
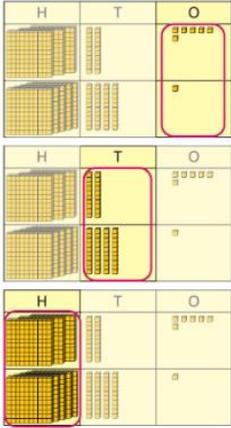
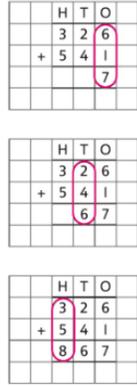
Decimals are introduced, as tenths in Year 3 and then as hundredths in Year 4. Children develop an understanding of decimals in terms of the relationship with fractions, with dividing by 10 and 100, and also with place value.

Year 3

	Concrete	Pictorial	Abstract
Year 3 Addition			
Understanding 100s	<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>
Understanding place value to 1,000	<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>$215 = 200 + 10 + 5$</p> <p>Recognise numbers to 1,000 represented on a number line, including those between intervals.</p>

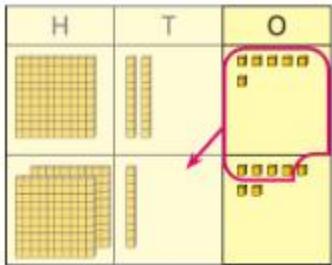
<p>Adding 100s</p>	<p>Use known facts and unitising to add multiples of 100.</p>  <p>$3 + 2 = 5$</p> <p><i>3 hundreds + 2 hundreds = 5 hundreds</i></p> <p>$300 + 200 = 500$</p>	<p>Use known facts and unitising to add multiples of 100.</p>  <p>$3 + 4 = 7$</p> <p><i>3 hundreds + 4 hundreds = 7 hundreds</i></p> <p>$300 + 400 = 700$</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>$3 + 2 = 5$</p> <p>$300 + 200 = 500$</p>												
<p>3-digit number + 1s, no exchange or bridging</p>	<p>Use number bonds to add the 1s.</p>  <p>$214 + 4 = ?$</p> <p><i>Now there are 4 + 4 ones in total.</i></p> <p>$4 + 4 = 8$</p> <p>$214 + 4 = 218$</p>	<p>Use number bonds to add the 1s.</p> <table border="1" data-bbox="965 868 1245 1075"> <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>$245 + 4$</p> <p>$5 + 4 = 9$</p> <p>$245 + 4 = 249$</p>	H	T	O							2	4	9	<p>Understand the link with counting on.</p> <p>$245 + 4$</p>  <p>Use number bonds to add the 1s and understand that this is more efficient and less prone to error.</p> <p>$245 + 4 = ?$</p> <p><i>I will add the 1s.</i></p> <p>$5 + 4 = 9$</p> <p>So, $245 + 4 = 249$</p>
H	T	O													
2	4	9													

<p>3-digit number + 10s, no exchange</p>	<p>Calculate mentally by forming the number bond for the 10s.</p>  <p>234 + 50 <i>There are 3 tens and 5 tens altogether.</i> $3 + 5 = 8$ <i>In total there are 8 tens.</i> $234 + 50 = 284$</p>	<p>Calculate mentally by forming the number bond for the 10s.</p> <p>$351 + 30 = ?$</p>  <p>$5 \text{ tens} + 3 \text{ tens} = 8 \text{ tens}$ $351 + 30 = 381$</p>	<p>Calculate mentally by forming the number bond for the 10s.</p> <p>$753 + 40$</p> <p><i>I know that $5 + 4 = 9$</i></p> <p>So, $50 + 40 = 90$ $753 + 40 = 793$</p>
<p>3-digit number + 1s with exchange</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>$135 + 7 = 142$</p>	<p>Understand how to bridge by partitioning to the 1s to make the next 10.</p>  <p>$135 + 7 = ?$ $135 + 5 + 2 = 142$</p> <p>Ensure that children understand how to add 1s bridging a 100.</p> <p>$198 + 5 = ?$ $198 + 2 + 3 = 203$</p>

<p>3-digit number + 10s, with exchange</p>	<p>Understand the exchange of 10 tens for 1 hundred.</p> 	<p>Add by exchanging 10 tens for 1 hundred.</p> $184 + 20 = ?$  $184 + 20 = 204$	<p>Understand how the addition relates to counting on in 10s across 100.</p>  $184 + 20 = ?$ <p><i>I can count in 10s ... 194 ... 204</i> $184 + 20 = 204$</p> <p>Use number bonds within 20 to support efficient mental calculations.</p> $385 + 50$ <p><i>There are 8 tens and 5 tens. That is 13 tens.</i> $385 + 50 = 300 + 130 + 5$ $385 + 50 = 435$</p>
<p>3-digit number + 3-digit number, no exchange</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>$326 + 541$ is represented as:</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> 

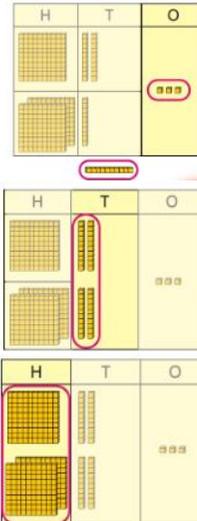
3-digit number + 3-digit number, exchange required

Use place value equipment to enact the exchange required.



*There are 13 ones.
I will exchange 10 ones for 1 ten.*

Model the stages of column addition using place value equipment on a place value grid.



Use column addition, ensuring understanding of place value at every stage of the calculation.

	H	T	O
	1	2	6
+	2	1	7
			3

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

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

$$126 + 217 = 343$$

Note: Children should also study examples where exchange is required in more than one column, for example $185 + 318 = ?$

3-digit number + 2-digit number

Use place value equipment to make and combine groups to model addition.



Use a place value grid to organise thinking and adding of 1s, then 10s.

Use the vertical column method to represent the addition. Children must understand how this relates to place value at each stage of the calculation.

3-digit number + 2-digit number, exchange required

Use place value equipment to model addition and understand where exchange is required.

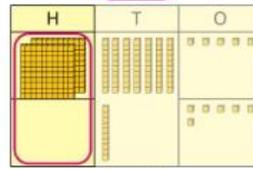
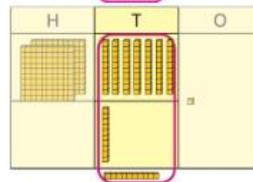
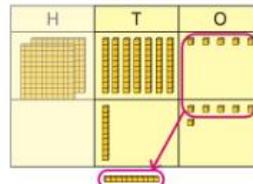
Use place value counters to represent $154 + 72$.

Use this to decide if any exchange is required.

There are 5 tens and 7 tens. That is 12 tens so I will exchange.

Represent the required exchange on a place value grid using equipment.

$$275 + 16 = ?$$



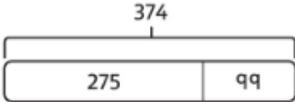
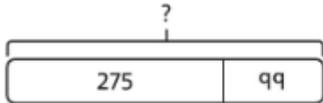
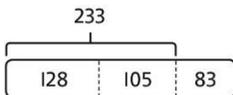
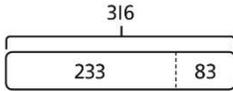
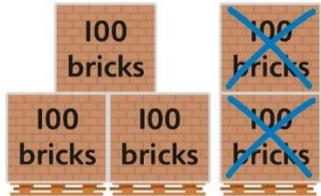
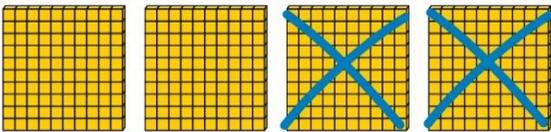
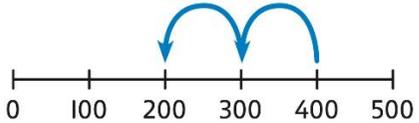
$$275 + 16 = 291$$

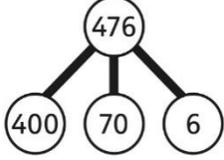
Note: In this example, a mental method may be more efficient. The numbers for the example calculation have been chosen to allow children to visualise the concept and see how the method relates to place value. Children should be encouraged at every stage to select methods that are accurate and efficient.

Use a column method with exchange. Children must understand how the method relates to place value at each stage of the calculation.



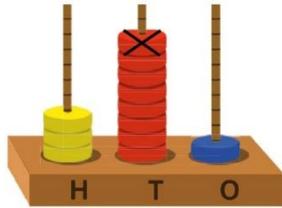
$$275 + 16 = 291$$

<p>Representing addition problems, and selecting appropriate methods</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>$275 + 99 = ?$</p>  <p>$275 + 99 = 374$</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>$128 + 105 + 83 = ?$</p> <p><i>I need to add three numbers.</i></p> <p>$128 + 105 = 233$</p>  
<p>Year 3 Subtraction</p>			
<p>Subtracting 100s</p>	<p>Use known facts and unitising to subtract multiples of 100.</p>  <p>$5 - 2 = 3$ $500 - 200 = 300$</p>	<p>Use known facts and unitising to subtract multiples of 100.</p>  <p>$4 - 2 = 2$ $400 - 200 = 200$</p>	<p>Understand the link with counting back in 100s.</p>  <p>$400 - 200 = 200$</p> <p>Use known facts and unitising as efficient and accurate methods.</p> <p><i>I know that $7 - 4 = 3$. Therefore, I know that $700 - 400 = 300$.</i></p>

<p>3-digit number – 1s, no exchange</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="958 247 1265 422"> <thead> <tr> <th>H</th> <th>T</th> <th>O</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>1</td> <td>9</td> </tr> </tbody> </table> <p>$319 - 4 = ?$</p> <table border="1" data-bbox="958 534 1265 710"> <thead> <tr> <th>H</th> <th>T</th> <th>O</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>1</td> <td>9</td> </tr> </tbody> </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>3-digit number – 1s, exchange or bridging required</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>$151 - 7 = ?$</p> <table border="1" data-bbox="967 1045 1339 1197"> <thead> <tr> <th>H</th> <th>T</th> <th>O</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table> <table border="1" data-bbox="967 1228 1339 1380"> <thead> <tr> <th>H</th> <th>T</th> <th>O</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>	H	T	O				H	T	O				<p>Calculate mentally by using known bonds.</p> <p>$151 - 7 = ?$</p> <p>$151 - 1 - 6 = 144$</p>						
H	T	O																			
H	T	O																			

**3-digit number
– 10s, no
exchange**

Subtract the 10s using known bonds.

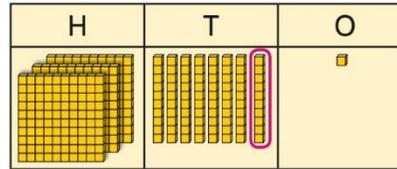


$$381 - 10 = ?$$

8 tens with 1 removed is 7 tens.

$$381 - 10 = 371$$

Subtract the 10s using known bonds.



$$8 \text{ tens} - 1 \text{ ten} = 7 \text{ tens}$$

$$381 - 10 = 371$$

Use known bonds to subtract the 10s mentally.

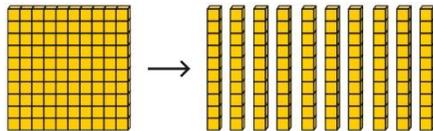
$$372 - 50 = ?$$

$$70 - 50 = 20$$

$$\text{So, } 372 - 50 = 322$$

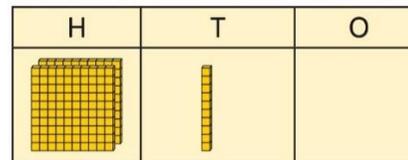
**3-digit number
– 10s,
exchange or
bridging
required**

Use equipment to understand the exchange of 1 hundred for 10 tens.

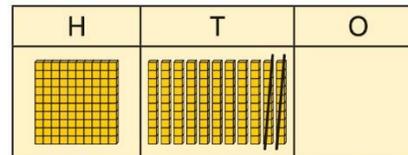


Represent the exchange on a place value grid using equipment.

$$210 - 20 = ?$$



I need to exchange 1 hundred for 10 tens, to help subtract 2 tens.

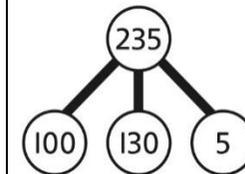


$$210 - 20 = 190$$

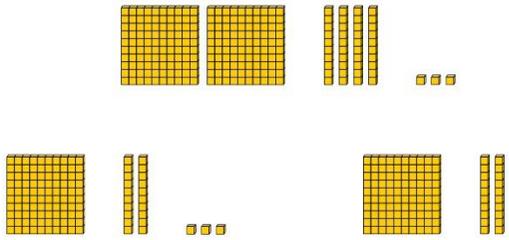
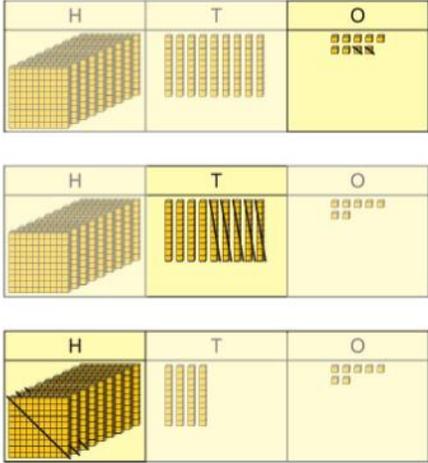
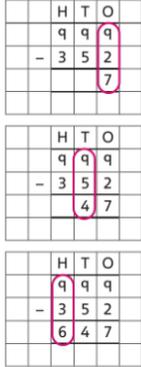
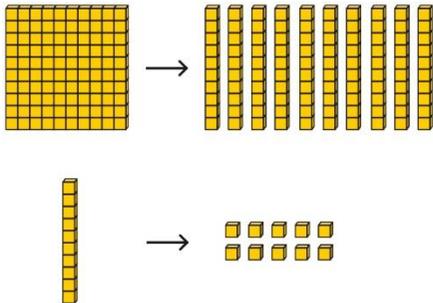
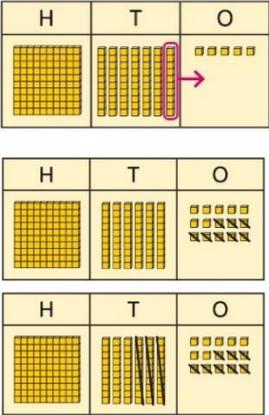
Understand the link with counting back on a number line.

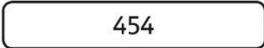
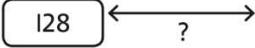
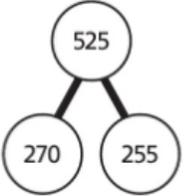
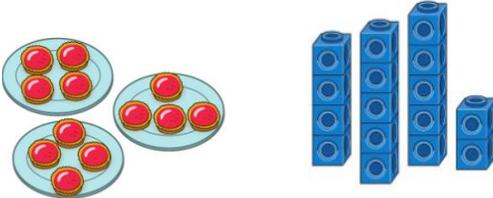
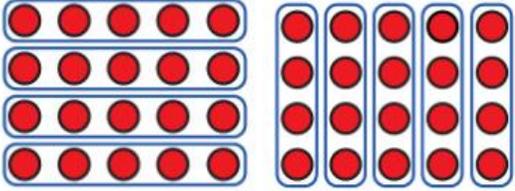
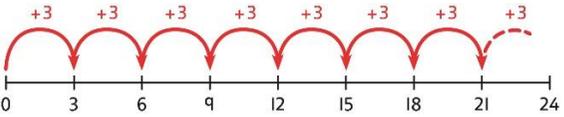
Use flexible partitioning to support the calculation.

$$235 - 60 = ?$$



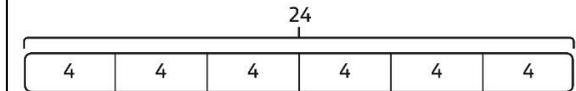
$$\begin{aligned} 235 &= 100 + 130 + 5 \\ 235 - 60 &= 100 + 70 + 5 \\ &= 175 \end{aligned}$$

<p>3-digit number – up to 3-digit number</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> 
<p>3-digit number – up to 3-digit number, exchange required</p>	<p>Use base 10 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>$175 - 38 = ?$ I need to subtract 8 ones, so I will exchange a ten for 10 ones.</p> 	<p>Use column subtraction to work accurately and efficiently.</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> 

<p>Representing subtraction problems</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> $525 - 270 = 255$ <i>I will check using addition.</i></p> <div style="display: flex; justify-content: space-around; align-items: center;"> <table border="1" data-bbox="1576 632 1794 815"> <tr><td></td><td></td><td>H</td><td>T</td><td>O</td><td></td></tr> <tr><td></td><td></td><td>2</td><td>7</td><td>0</td><td></td></tr> <tr><td></td><td>+</td><td>2</td><td>5</td><td>5</td><td></td></tr> <tr><td></td><td></td><td>5</td><td>2</td><td>5</td><td></td></tr> </table>  </div>			H	T	O				2	7	0			+	2	5	5				5	2	5	
		H	T	O																							
		2	7	0																							
	+	2	5	5																							
		5	2	5																							
<p>Year 3 Multiplication</p>																											
<p>Understanding equal grouping and repeated addition</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> <div style="text-align: center;">  </div> <p>Children recognise that arrays can be used to model commutative multiplications.</p>	<p>Children recognise that arrays demonstrate commutativity.</p> <div style="text-align: center;">  </div> <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> <div style="text-align: center;">  </div> <p><i>8 groups of 3 is 24.</i></p> <p>$3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 = 24$ $8 \times 3 = 24$</p> <p>A bar model may represent multiplications as equal groups.</p>																								



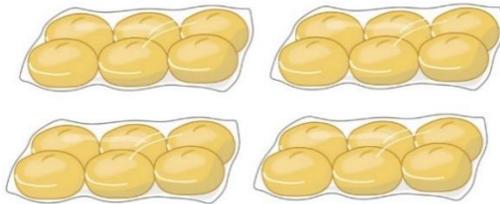
*I can see 3 groups of 8.
I can see 8 groups of 3.*



$$6 \times 4 = 24$$

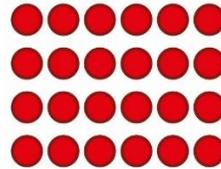
Using commutativity to support understanding of the times-tables

Understand how to use times-tables facts flexibly.



*There are 6 groups of 4 pens.
There are 4 groups of 6 bread rolls.
I can use $6 \times 4 = 24$ to work out both totals.*

Understand how times-table facts relate to commutativity.



$$6 \times 4 = 24$$

$$4 \times 6 = 24$$

Understand how times-table facts relate to commutativity.

I need to work out 4 groups of 7.

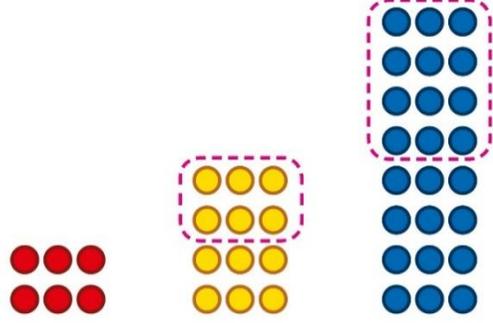
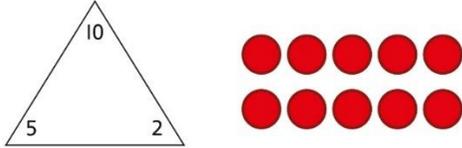
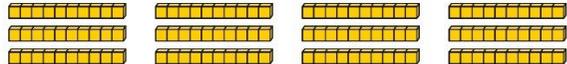
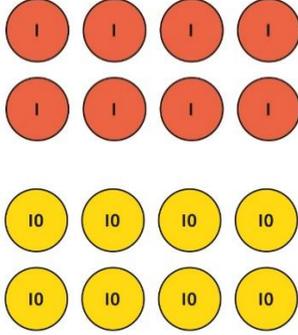
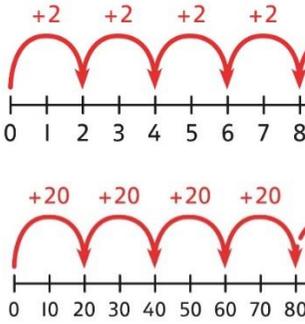
I know that $7 \times 4 = 28$

so, I know that

4 groups of 7 = 28

and

7 groups of 4 = 28.

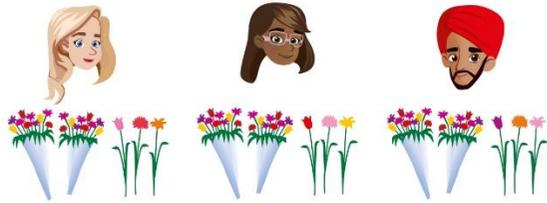
<p>Understanding and using $\times 3$, $\times 2$, $\times 4$ and $\times 8$ tables.</p>	<p>Children learn the times-tables as 'groups of' but apply their knowledge of commutativity.</p>  <p><i>I can use the $\times 3$ table to work out how many keys.</i> <i>I can also use the $\times 3$ table to work out how many batteries.</i></p>	<p>Children understand how the $\times 2$, $\times 4$ and $\times 8$ tables are related through repeated doubling.</p>  <p>$3 \times 2 = 6$ $3 \times 4 = 12$ $3 \times 8 = 24$</p>	<p>Children understand the relationship between related multiplication and division facts in known times-tables.</p>  <p>$2 \times 5 = 10$ $5 \times 2 = 10$ $10 \div 5 = 2$ $10 \div 2 = 5$</p>
<p>Using known facts to multiply 10s, for example 3×40</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>$4 \times 2 = 8$ $4 \times 20 = 80$</p>	<p>Understand how to use known times-tables to multiply multiples of 10.</p>  <p>$4 \times 2 = 8$ $4 \times 20 = 80$</p>

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

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

Each person has 23 flowers.

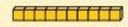
Each person has 2 tens and 3 ones.



There are 3 groups of 2 tens.

There are 3 groups of 3 ones.

Use place value equipment to model the multiplication context.

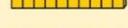
	T	O
	 	  
	 	  
	 	  

There are 3 groups of 3 ones.

There are 3 groups of 2 tens.

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
 	  
 	
 	

$$3 \times 20 = 60$$

$$60 + 12 = 72$$

$$3 \times 24 = 72$$

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

$$4 \times 13 = ?$$

$$4 \times 3 = 12$$

$$4 \times 10 = 40$$

$$12 + 40 = 52$$

$$4 \times 13 = 52$$

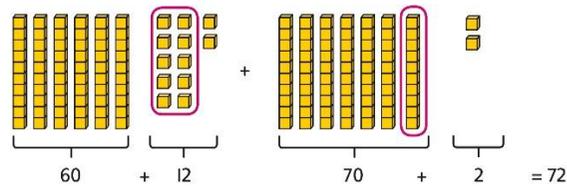
Multiplying a 2-digit number by a 1-digit number, expanded column method

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

$$3 \times 24 = ?$$

$$3 \times 20 = 60$$

$$3 \times 4 = 12$$



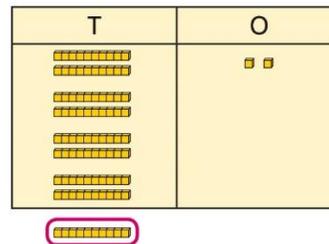
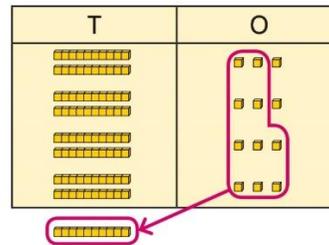
$$3 \times 24 = 60 + 12$$

$$3 \times 24 = 70 + 2$$

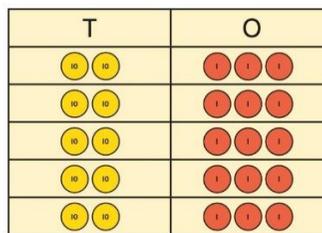
$$3 \times 24 = 72$$

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

$$4 \times 23 = ?$$



$$4 \times 23 = 92$$



$$5 \times 23 = ?$$

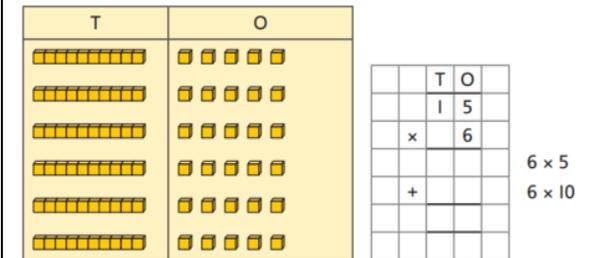
$$5 \times 3 = 15$$

$$5 \times 20 = 100$$

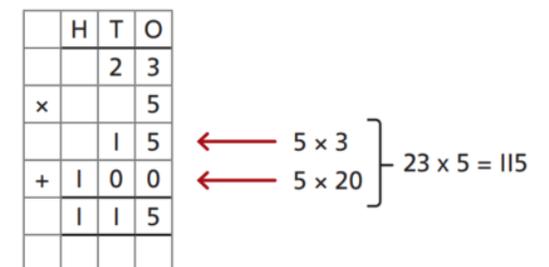
$$5 \times 23 = 115$$

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.



$$23 \times 5 = ?$$



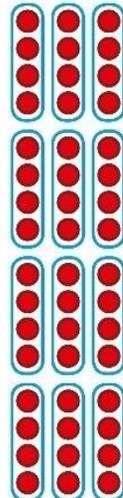
Using times-tables knowledge to divide

Use knowledge of known times-tables to calculate divisions.



*24 divided into groups of 8.
There are 3 groups of 8.*

Use knowledge of known times-tables to calculate divisions.



$$48 \div 4 = 12$$

*48 divided into groups of 4.
There are 12 groups.*

$$4 \times 12 = 48$$

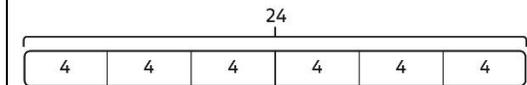
$$48 \div 4 = 12$$

Use knowledge of known times-tables to calculate divisions.

I need to work out 30 shared between 5.

*I know that $6 \times 5 = 30$
so I know that $30 \div 5 = 6$.*

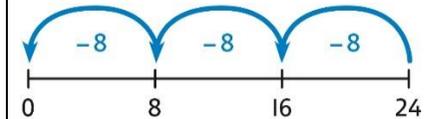
A bar model may represent the relationship between sharing and grouping.



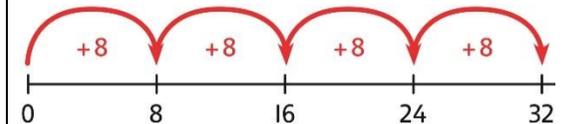
$$24 \div 4 = 6$$

$$24 \div 6 = 4$$

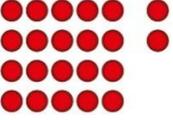
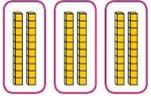
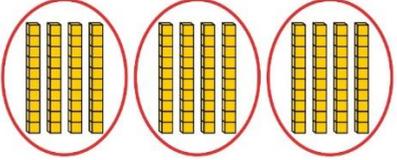
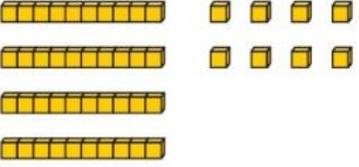
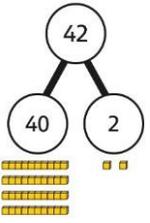
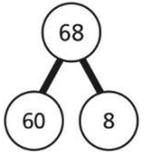
Children understand how division is related to both repeated subtraction and repeated addition.

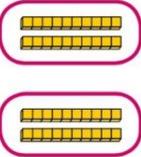
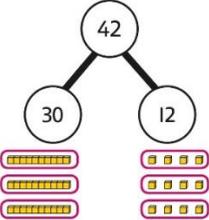


$$24 \div 8 = 3$$

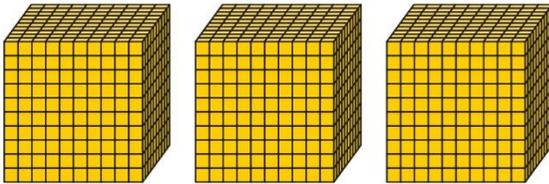
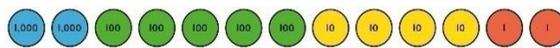
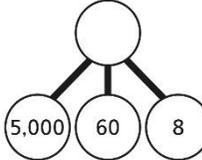
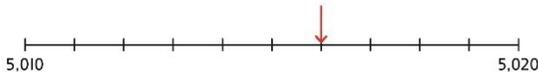


$$32 \div 8 = 4$$

<p>Understanding remainders</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>$22 \div 5 = 4 \text{ remainder } 2$</p>	<p>Understand that the remainder is what cannot be shared equally from a set.</p> <p>$22 \div 5 = ?$</p> <p>$3 \times 5 = 15$ $4 \times 5 = 20$ $5 \times 5 = 25 \dots \text{this is larger than } 22$ So, $22 \div 5 = 4 \text{ remainder } 2$</p>
<p>Using known facts to divide multiples of 10</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>$180 \div 3 = ?$</p> <p><i>180 is 18 tens. 18 divided by 3 is 6. 18 tens divided by 3 is 6 tens.</i></p> <p>$18 \div 3 = 6$ $180 \div 3 = 60$</p>
<p>2-digit number divided by 1-digit number, no remainders</p>	<p>Children explore dividing 2-digit numbers by using place value equipment.</p>  <p>$48 \div 2 = ?$</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>$60 \div 2 = 30$ $8 \div 2 = 4$ $68 \div 2 = 34$</p>

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

Year 4

	Concrete	Pictorial	Abstract												
Year 4 Addition															
Understanding numbers to 10,000	<p>Use place value equipment to understand the place value of 4-digit numbers.</p>  <p>4 thousands equal 4,000. 1 thousand is 10 hundreds.</p>	<p>Represent numbers using place value counters once children understand the relationship between 1,000s and 100s.</p>  <p>$2,000 + 500 + 40 + 2 = 2,542$</p>	<p>Understand partitioning of 4-digit numbers, including numbers with digits of 0.</p>  <p>$5,000 + 60 + 8 = 5,068$</p> <p>Understand and read 4-digit numbers on a number line.</p> 												
Choosing mental methods where appropriate	<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> <p>$1,405 + 2,000 = 3,405$</p>	<p>Use unitising and known facts to support mental calculations.</p> <table border="1" data-bbox="952 981 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> <p>$200 + 300 = 500$ So, $4,256 + 300 = 4,556$</p>	Th	H	T	O									<p>Use unitising and known facts to support mental calculations.</p> <p>$4,256 + 300 = ?$</p> <p>$2 + 3 = 5$ $200 + 300 = 500$</p> <p>$4,256 + 300 = 4,556$</p>
Th	H	T	O												
Column addition	<p>Use place value equipment on a place value grid to organise thinking.</p>	<p>Use place value equipment to model required exchanges.</p>	<p>Use a column method to add, including exchanges.</p>												

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
●	●●●●●●●●		●●●●●●●●
	●●●●●●●●	●●●●●●●●	●●●●●●●●

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

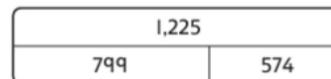
Which columns will total 10 or more?

Include examples that exchange in more than one column.

Include examples that exchange in more than one column.

Representing additions and checking strategies

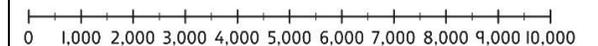
Bar models may be used to represent additions in problem contexts, and to justify mental methods where appropriate.



	Th	H	T	O
		7	9	9
+		5	7	4
	1	3	7	3
	'	'	'	'

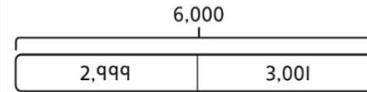
I chose to work out $574 + 800$, then subtract 1.

Use rounding and estimating on a number line to check the reasonableness of an addition.



$$912 + 6,149 = ?$$

I used rounding to work out that the answer should be approximately $1,000 + 6,000 = 7,000$.

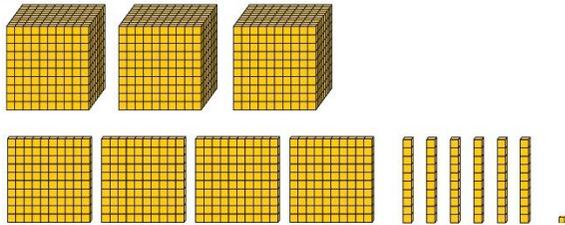


This is equivalent to 3,000 + 3,000.

**Year 4
Subtraction**

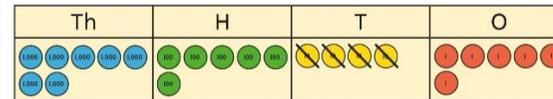
**Choosing
mental
methods
where
appropriate**

Use place value equipment to justify mental methods.



What number will be left if we take away 300?

Use place value grids to support mental methods where appropriate.



$$7,646 - 40 = 7,606$$

Use knowledge of place value and unitising to subtract mentally where appropriate.

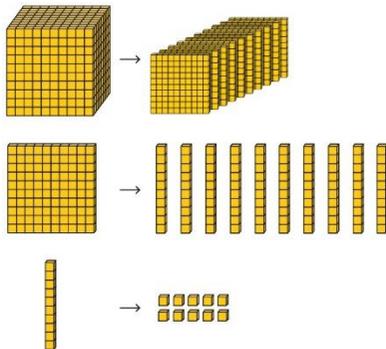
$$3,501 - 2,000$$

3 thousands - 2 thousands = 1 thousand

$$3,501 - 2,000 = 1,501$$

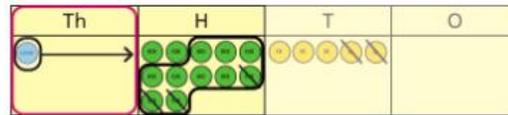
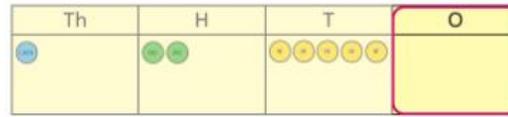
**Column
subtraction**

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



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

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



	Th	H	T	O
	1	2	5	0
-		3	2	0
			0	0

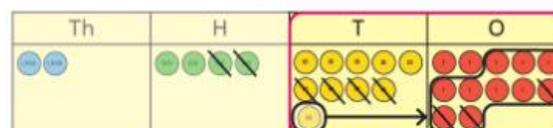
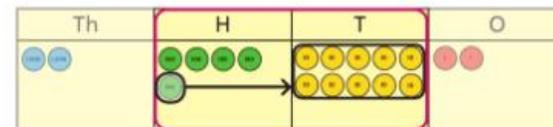
	Th	H	T	O
	1	2	5	0
-		3	2	0
			3	0

	Th	H	T	O
	1	2	5	0
-		3	2	0
	9		3	0

	Th	H	T	O
	1	2	5	0
-		3	2	0
	9		3	0

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

$$2,502 - 243 = ?$$



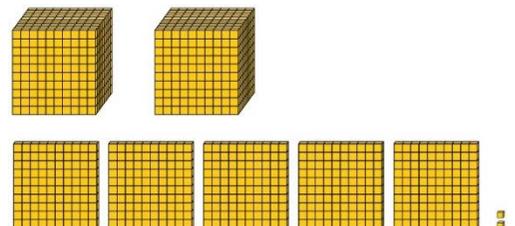
Make exchanges across more than one column where there is a zero as a place holder.

$$2,502 - 243 = ?$$

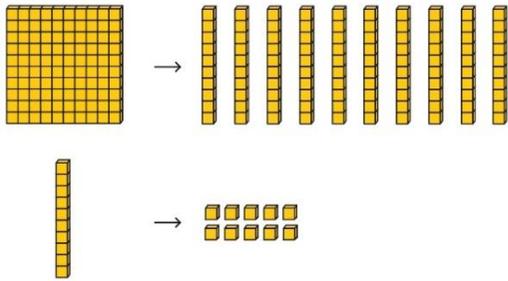
Column subtraction with exchange across more than one column

Understand why two exchanges may be necessary.

$$2,502 - 243 = ?$$



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



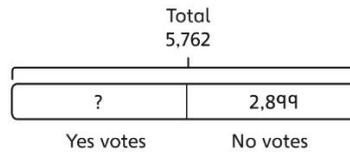
	Th	H	T	O
	2	8	0	2
-		2	4	3

	Th	H	T	O
	2	8	0	2
-		2	4	3

	Th	H	T	O
	2	8	0	2
-		2	4	3
	2	2	5	9

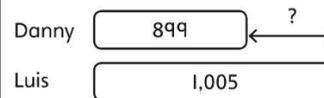
Representing subtractions and checking strategies

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



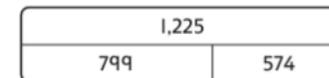
I can work out the total number of Yes votes using $5,762 - 2,899$.

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



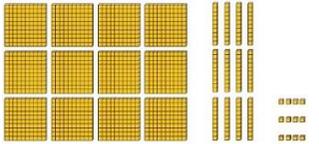
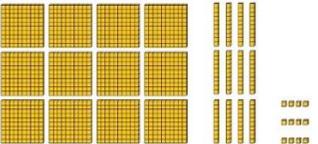
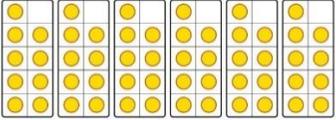
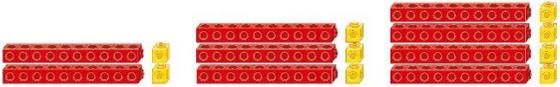
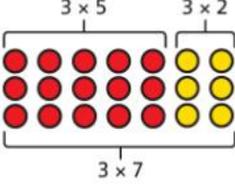
Use inverse operations to check subtractions.

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



	Th	H	T	O
		7	9	9
+		5	7	4
	1	3	7	3
	1	1	1	

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

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

Understanding and using partitioning in multiplication

Make multiplications by partitioning.
 4×12 is 4 groups of 10 and 4 groups of 2.

$4 \times 12 = 40 + 8$

Understand how multiplication and partitioning are related through addition.

$4 \times 3 = 12$ $4 \times 5 = 20$ $4 \times 8 = 32$

$4 \times 3 = 12$
 $4 \times 5 = 20$
 $12 + 20 = 32$

$4 \times 8 = 32$

Use partitioning to multiply 2-digit numbers by a single digit.

$18 \times 6 = ?$

$18 \times 6 = 10 \times 6 + 8 \times 6$
 $= 60 + 48$
 $= 108$

$18 \times 6 = 10 \times 6 + 8 \times 6$
 $= 60 + 48$
 $= 108$

Column multiplication for 2- and 3-digit numbers multiplied by a single digit

Use place value equipment to make multiplications.
 Make 4×136 using equipment.

I can work out how many 1s, 10s and 100s.

There are 4×6 ones... 24 ones
 There are 4×3 tens ... 12 tens
 There are 4×1 hundreds ... 4 hundreds

$24 + 120 + 400 = 544$

Use place value equipment alongside a column method for multiplication of up to 3-digit numbers by a single digit.

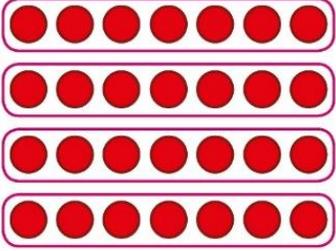
	H	T	O
	3	1	2
x			4
	1	2	4
	1	2	4
	1	2	4
	1	2	4

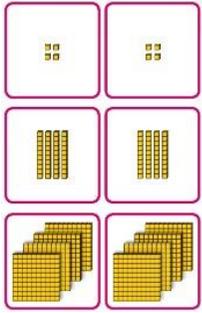
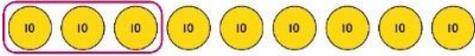
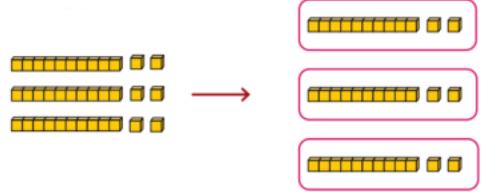
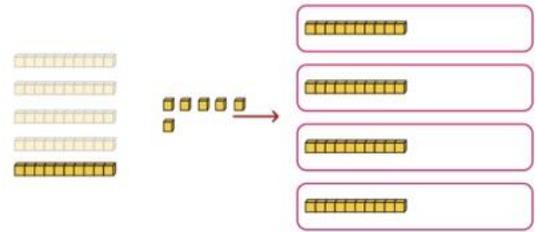
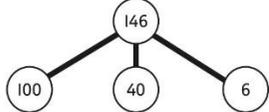
Use the formal column method for up to 3-digit numbers multiplied by a single digit.

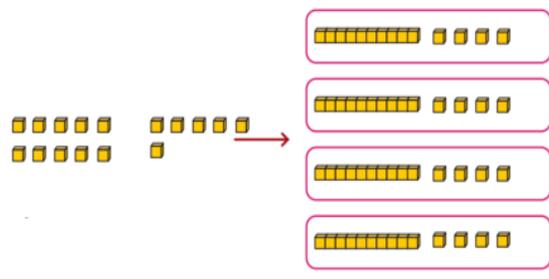
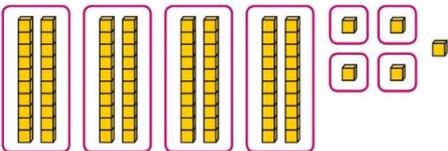
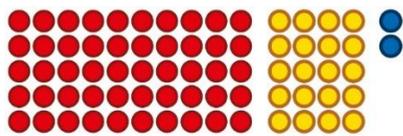
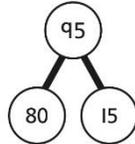
	H	T	O
		3	2
x			3
	9	3	6

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.

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

<p>Multiplying more than two numbers</p>	<p>Represent situations by multiplying three numbers together.</p>  <p>Each sheet has 2×5 stickers. There are 3 sheets.</p> <p>There are $5 \times 2 \times 3$ stickers in total.</p> $\underbrace{5 \times 2 \times 3}_{10 \times 3} = 30$	<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> $24 \times 5 = 12 \times 2 \times 5$ $12 \times 2 \times 5 =$ $\underbrace{12 \times 10}_{120} = 120$ <p>So, $24 \times 5 = 120$</p>
<p>Year 4 Division</p>			
<p>Understanding the relationship between multiplication and division, including times-tables</p>	<p>Use objects to explore families of multiplication and division facts.</p>  $4 \times 6 = 24$ <p>24 is 6 groups of 4. 24 is 4 groups of 6.</p> <p>24 divided by 6 is 4. 24 divided by 4 is 6.</p>	<p>Represent divisions using an array.</p>  $28 \div 7 = 4$	<p>Understand families of related multiplication and division facts.</p> <p><i>I know that $5 \times 7 = 35$</i></p> <p><i>so I know all these facts:</i></p> $5 \times 7 = 35$ $7 \times 5 = 35$ $35 = 5 \times 7$ $35 = 7 \times 5$ $35 \div 5 = 7$ $35 \div 7 = 5$ $7 = 35 \div 5$ $5 = 35 \div 7$

<p>Dividing multiples of 10 and 100 by a single digit</p>	<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>$9 \div 3 = \square$</p>  <p>$90 \div 3 = \square$</p>  <p>$900 \div 3 = \square$</p>  <p>$9 \div 3 = 3$</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>$15 \div 3 = 5$</p> <p>$150 \div 3 = 50$</p> <p>$1500 \div 3 = 500$</p>
<p>Divide by sharing</p>	<p>Share using place value equipment</p> <p><i>36 shared equally between 3 groups</i></p>  <p>$36 \div 3 = 12$</p>	<p>Share by exchanging</p> <p><i>56 shared equally between 4 groups</i></p> <p><i>First share the 10s.</i></p>  <p><i>Exchange 1 ten for 1s, then share all the 1s.</i></p>	<p>Share using known facts and partitioning where appropriate</p> <p>$142 \div 2 = ?$</p>  <p>$100 \div 2 = \square$ $40 \div 2 = \square$ $6 \div 2 = \square$</p> <p>$100 \div 2 = 50$ $40 \div 2 = 20$ $6 \div 2 = 3$ $50 + 20 + 3 = 73$ $142 \div 2 = 73$</p>

		 <p>$56 \div 4 = 14$</p>	
<p>Understanding remainders</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>$72 \div 5 = 14 \text{ remainder } 2$</p>	<p>Understand how partitioning can reveal remainders of divisions.</p>  <p>$80 \div 4 = 20$</p> <p>$12 \div 4 = 3$</p> <p>$95 \div 4 = 23 \text{ remainder } 3$</p>

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.

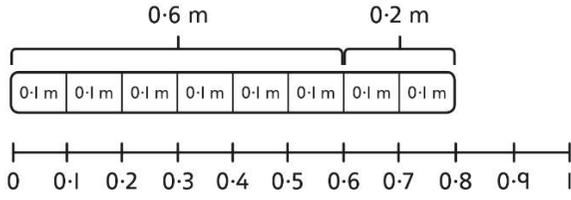
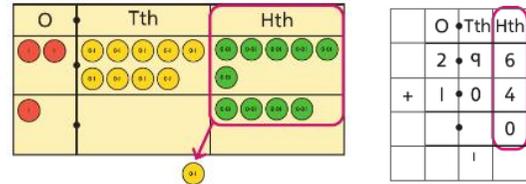
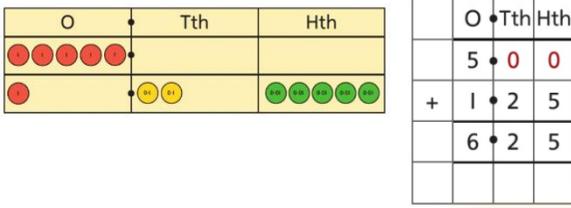
Fractions: Children find fractions of amounts, multiply a fraction by a whole number and by another fraction, divide a fraction by a whole number, and add and subtract fractions with different denominators. Children become more confident working with improper fractions and mixed numbers and can calculate 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
Year 5 Addition			
Column addition with whole numbers	<p>Use place value equipment to represent additions.</p> <p>Add a row of counters onto the place value grid to show $15,735 + 4,012$.</p>	<p>Represent additions, using place value equipment on a place value grid alongside written methods.</p> <p>I need to exchange 10 tens for a 100.</p>	<p>Use column addition, including exchanges.</p>
Representing additions		<p>Bar models represent addition of two or more numbers in the context of problem solving.</p>	<p>Use approximation to check whether answers are reasonable.</p> <p>I will use $23,000 + 8,000$ to check.</p>

		<table border="1" style="display: inline-table; margin-right: 20px;"> <tr><td></td><td>Th</td><td>H</td><td>T</td><td>O</td></tr> <tr><td></td><td>2</td><td>6</td><td>0</td><td>0</td></tr> <tr><td>+</td><td>1</td><td>4</td><td>5</td><td>0</td></tr> <tr><td></td><td>4</td><td>0</td><td>5</td><td>0</td></tr> <tr><td></td><td></td><td></td><td></td><td></td></tr> </table> <table border="1" style="display: inline-table;"> <tr><td></td><td>Th</td><td>H</td><td>T</td><td>O</td></tr> <tr><td></td><td>2</td><td>6</td><td>0</td><td>0</td></tr> <tr><td>+</td><td>4</td><td>0</td><td>5</td><td>0</td></tr> <tr><td></td><td>6</td><td>6</td><td>5</td><td>0</td></tr> <tr><td></td><td></td><td></td><td></td><td></td></tr> </table>		Th	H	T	O		2	6	0	0	+	1	4	5	0		4	0	5	0							Th	H	T	O		2	6	0	0	+	4	0	5	0		6	6	5	0						
	Th	H	T	O																																																	
	2	6	0	0																																																	
+	1	4	5	0																																																	
	4	0	5	0																																																	
	Th	H	T	O																																																	
	2	6	0	0																																																	
+	4	0	5	0																																																	
	6	6	5	0																																																	
<p>Adding tenths</p>	<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><i>How long are they when added together?</i></p> 	<p>Use a bar model with a number line to add tenths.</p>  <p>$0.6 + 0.2 = 0.8$</p> <p><i>6 tenths + 2 tenths = 8 tenths</i></p>	<p>Understand the link with adding fractions.</p> $\frac{6}{10} + \frac{2}{10} = \frac{8}{10}$ <p><i>6 tenths + 2 tenths = 8 tenths</i></p> <p>$0.6 + 0.2 = 0.8$</p>																																																		
<p>Adding decimals using column addition</p>	<p>Use place value equipment to represent additions.</p> <p><i>Show $0.23 + 0.45$ using place value counters.</i></p>	<p>Use place value equipment on a place value grid to represent additions.</p> <p>Represent exchange where necessary.</p>  <p>Include examples where the numbers of decimal places are different.</p> 	<p>Add using a column method, ensuring that children understand the link with place value.</p> <table border="1" style="margin-bottom: 20px;"> <tr><td></td><td>O</td><td>Tth</td><td>Hth</td></tr> <tr><td></td><td>0</td><td>2</td><td>3</td></tr> <tr><td>+</td><td>0</td><td>4</td><td>5</td></tr> <tr><td></td><td>0</td><td>6</td><td>8</td></tr> </table> <p>Include exchange where required, alongside an understanding of place value.</p> <table border="1"> <tr><td></td><td>O</td><td>Tth</td><td>Hth</td></tr> <tr><td></td><td>0</td><td>5</td><td>7</td></tr> <tr><td>+</td><td>0</td><td>4</td><td>3</td></tr> <tr><td></td><td>1</td><td>0</td><td>0</td></tr> </table>		O	Tth	Hth		0	2	3	+	0	4	5		0	6	8		O	Tth	Hth		0	5	7	+	0	4	3		1	0	0																		
	O	Tth	Hth																																																		
	0	2	3																																																		
+	0	4	5																																																		
	0	6	8																																																		
	O	Tth	Hth																																																		
	0	5	7																																																		
+	0	4	3																																																		
	1	0	0																																																		

Include additions where the numbers of decimal places are different.

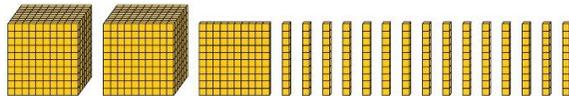
	O	Tth	Hth
	2	3	1
+	0	7	0
		•	

**Year 5
Subtraction**

**Column
subtraction
with whole
numbers**

Use place value equipment to understand where exchanges are required.

$$2,250 - 1,070 = ?$$



Represent the stages of the calculation using place value equipment on a grid alongside the calculation, including exchanges where required.

$$15,735 - 2,582 = 13,153$$

TTh	Th	H	T	O
●	●●●●●●●●	●●●●●●●●	●●●●●●●●	●●●●●●●●

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

TTh	Th	H	T	O
●	●●●●●●●●	●●●●●●●●	●●●●●●●●	●●●●●●●●

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

TTh	Th	H	T	O
●	●●●●●●●●	●●●●●●●●	●●●●●●●●	●●●●●●●●

Use column subtraction methods with exchange where required.

	TTh	Th	H	T	O
	5	2	5	9	7
-	1	8	0	3	4
	4	4	5	6	3

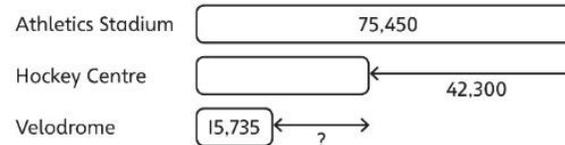
$$62,597 - 18,034 = 44,563$$

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

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

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

Bar models represent subtractions in problem contexts, including 'find the difference'.



Children can explain the mistake made when the columns have not been ordered correctly.

Use approximation to check calculations.

Bella's working

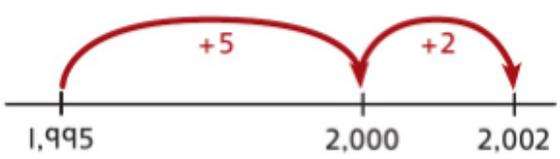
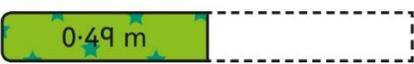
	TTh	Th	H	T	O
	1	7	8	7	7
+	4	0	1	2	
	5	7	9	9	7

Correct method

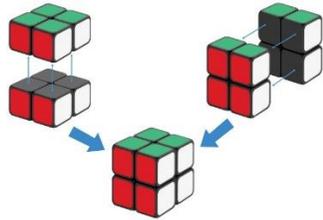
	TTh	Th	H	T	O
	1	7	8	7	7
+		4	0	1	2
	2	1	8	8	9

I calculated 18,000 + 4,000 mentally to check my subtraction.

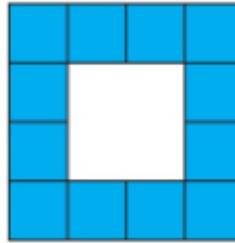
Checking strategies and representing subtractions

<p>Choosing efficient methods</p>			<p>To subtract two large numbers that are close, children find the difference by counting on.</p> <p>$2,002 - 1,995 = ?$</p>  <p>Use addition to check subtractions.</p> <p><i>I calculated $7,546 - 2,355 = 5,191$. I will check using the inverse.</i></p>																									
<p>Subtracting decimals</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>$1 - 0.49 = ?$</p>	<p>Use a place value grid to represent the stages of column subtraction, including exchanges where required.</p> <p>$5.74 - 2.25 = ?$</p>	<p>Use column subtraction, with an understanding of place value, including subtracting numbers with different numbers of decimal places.</p> <p>$2.000 - 0.296 = ?$</p> <table border="1" data-bbox="1556 957 1803 1189"> <thead> <tr> <th></th> <th>O</th> <th>Tth</th> <th>Hth</th> <th>Thth</th> </tr> </thead> <tbody> <tr> <td></td> <td>2</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>-</td> <td>0</td> <td>2</td> <td>9</td> <td>6</td> </tr> <tr> <td></td> <td>1</td> <td>7</td> <td>0</td> <td>4</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		O	Tth	Hth	Thth		2	0	0	0	-	0	2	9	6		1	7	0	4					
	O	Tth	Hth	Thth																								
	2	0	0	0																								
-	0	2	9	6																								
	1	7	0	4																								

Use cubes to explore cube numbers.



8 is a cube number.



12 is not a square number, because you cannot multiply a whole number by itself to make 12.

Multiplying by 10, 100 and 1,000

Use place value equipment to multiply by 10, 100 and 1,000 by unitising.

$4 \times 1 = 4 \text{ ones} = 4$	
$4 \times 10 = 4 \text{ tens} = 40$	
$4 \times 100 = 4 \text{ hundreds} = 400$	

Understand the effect of repeated multiplication by 10.



$7 \times 10 = 70$
 $7 \times 100 = 7,000$
 $7 \times 1,000 = 70,000$

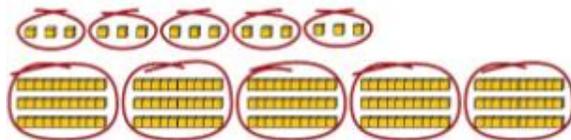
Understand how exchange relates to the digits when multiplying by 10, 100 and 1,000.

H	T	O
	1	7

$17 \times 10 = 170$
 $17 \times 100 = 17 \times 10 \times 10 = 1,700$
 $17 \times 1,000 = 17 \times 10 \times 10 \times 10 = 17,000$

Multiplying by multiples of 10, 100 and 1,000

Use place value equipment to explore multiplying by unitising.

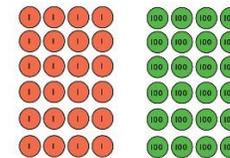


5 groups of 3 ones is 15 ones.
 5 groups of 3 tens is 15 tens.

Use place value equipment to represent how to multiply by multiples of 10, 100 and 1,000.



$4 \times 3 = 12$
 $4 \times 30 = 1,200$
 $4 \times 300 = 1,200$



$6 \times 4 = 24$
 $6 \times 40 = 2,400$
 $6 \times 400 = 2,400$

Use known facts and unitising to multiply.

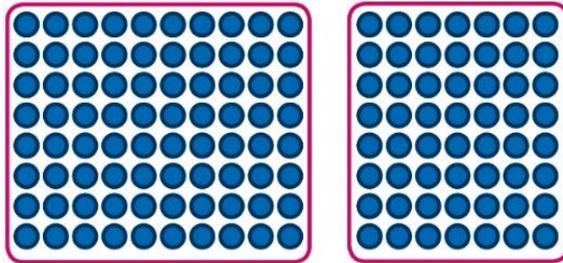
$5 \times 4 = 20$
 $5 \times 40 = 200$
 $5 \times 400 = 2,000$
 $5 \times 4,000 = 20,000$
 $5,000 \times 4 = 20,000$

So, I know that 5 groups of 3 thousands would be 15 thousands.

Multiplying up to 4-digit numbers by a single digit

Explore how to use partitioning to multiply efficiently.

$8 \times 17 = ?$



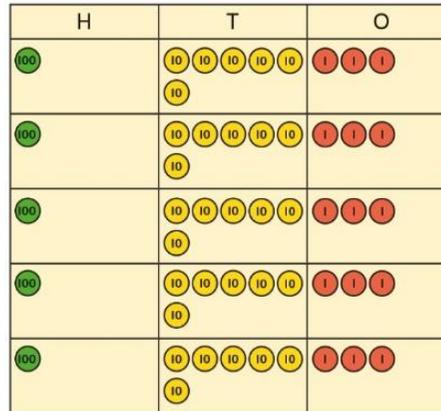
$8 \times 10 = 80$

$8 \times 7 = 56$

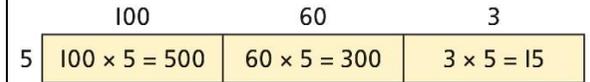
$80 + 56 = 136$

So, $8 \times 17 = 136$

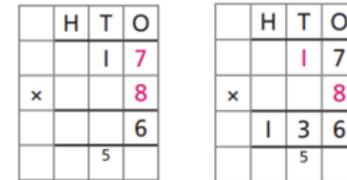
Represent multiplications using place value equipment and add the 1s, then 10s, then 100s, then 1,000s.



Use an area model and then add the parts.



Use a column multiplication, including any required exchanges.



Multiplying 2-digit numbers by 2-digit numbers

Partition one number into 10s and 1s, then add the parts.

$23 \times 15 = ?$

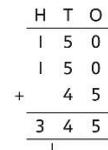


$10 \times 15 = 150$

$10 \times 15 = 150$



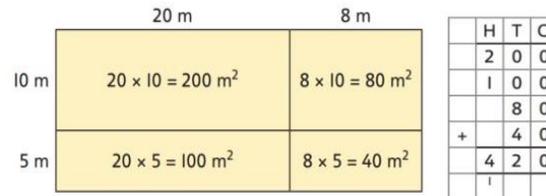
$3 \times 15 = 45$



There are 345 bottles of milk in total.

Use an area model and add the parts.

$28 \times 15 = ?$



$28 \times 15 = 420$

Use column multiplication, ensuring understanding of place value at each stage.



34×7

34×20

34×27

$$23 \times 15 = 345$$

Multiplying up to 4-digits by 2-digits

Use the area model then add the parts.

	100	40	3
10	$100 \times 10 = 1,000$	$40 \times 10 = 400$	$3 \times 10 = 30$
2	$100 \times 2 = 200$	$40 \times 2 = 80$	$3 \times 2 = 6$

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

$$143 \times 12 = 1,716$$

Use column multiplication, ensuring understanding of place value at each stage.

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

Progress to include examples that require multiple exchanges as understanding, confidence and fluency build.

$$1,274 \times 32 = ?$$

First multiply 1,274 by 2.

First multiply 1,274 by 2.

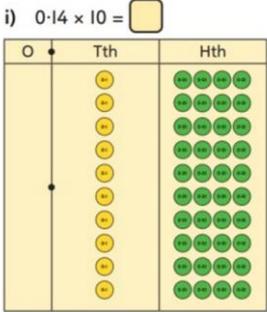
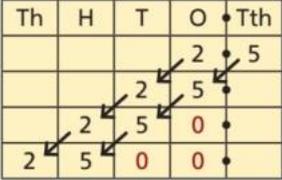
	TTh	Th	H	T	O	
		1	2	7	4	
x				3	2	
		2	5	4	8	1,274 × 2

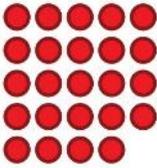
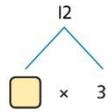
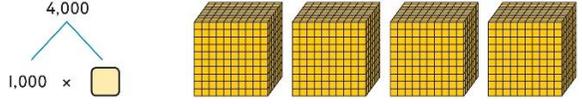
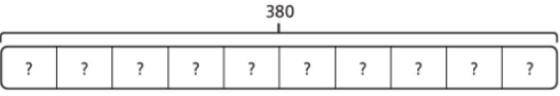
Then multiply 1,274 by 30.

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

Finally add up the numbers.

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

<p>Multiplying decimals by 10, 100 and 1,000</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>i) $0.14 \times 10 = \square$</p>  <p>$0.14 \times 10 = 1.4$</p>	<p>Understand how this exchange is represented on a place value chart.</p>  <p>$2.5 \times 10 = 25$ $2.5 \times 100 = 250$ $2.5 \times 1,000 = 2,500$</p>
<p>Year 5 Division</p>			
<p>Understanding factors and prime numbers</p>	<p>Use equipment to explore the factors of a given number.</p>  <p>$24 \div 3 = 8$ $24 \div 8 = 3$</p> <p><i>8 and 3 are factors of 24 because they divide 24 exactly.</i></p>	<p>Understand that prime numbers are numbers with exactly two factors.</p> <p>$13 \div 1 = 13$ $13 \div 2 = 6 r 1$ $13 \div 4 = 4 r 1$</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>

	<p>$24 \div 5 = 4$ remainder 4.</p>  <p><i>5 is not a factor of 24 because there is a remainder.</i></p>										
<p>Understanding inverse operations and the link with multiplication, grouping and sharing</p>	<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>$60 \div 4 = 15$ $60 \div 15 = 4$</p>	<p>Represent the different multiplicative relationships to solve problems requiring inverse operations.</p> <p>$12 \div 3 = \square$ $12 \div \square = 3$ $\square \times 3 = 12$ $\square \div 3 = 12$</p>  <p>Understand missing number problems for division calculations and know how to solve them using inverse operations.</p> <p>$22 \div ? = 2$ $22 \div 2 = ?$ $? \div 2 = 22$ $? \div 22 = 2$</p>								
<p>Dividing whole numbers by 10, 100 and 1,000</p>	<p>Use place value equipment to support unitising for division.</p> <p>$4,000 \div 1,000$</p>  <p>$4,000$ is 4 thousands.</p>	<p>Use a bar model to support dividing by unitising.</p> <p>$380 \div 10 = 38$</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="1568 1244 2128 1348"> <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>$3,200 \div 100 = ?$ <i>3,200 is 3 thousands and 2 hundreds.</i></p>	Th	H	T	O	3	2	0	0
Th	H	T	O								
3	2	0	0								

	<p>$4 \times 1,000 = 4,000$</p> <p>So, $4,000 \div 1,000 = 4$</p>	<p style="text-align: center;">380</p> <p style="text-align: center;"> </p> <p>380 is 38 tens. $38 \times 10 = 380$ $10 \times 38 = 380$ So, $380 \div 10 = 38$</p>	<p>$200 \div 100 = 2$ $3,000 \div 100 = 30$ $3,200 \div 100 = 32$</p> <p>So, the digits will move two places to the right.</p>
<p>Dividing by multiples of 10, 100 and 1,000</p>	<p>Use place value equipment to represent known facts and unitising.</p> <p></p> <p>15 ones put into groups of 3 ones. There are 5 groups. $15 \div 3 = 5$</p> <p>15 tens put into groups of 3 tens. There are 5 groups.</p> <p>$150 \div 30 = 5$</p>	<p>Represent related facts with place value equipment when dividing by unitising.</p> <p></p> <p>180 is 18 tens. 18 tens divided into groups of 3 tens. There are 6 groups. $180 \div 30 = 6$</p> <p>12 ones divided into groups of 4. There are 3 groups. 12 hundreds divided into groups of 4 hundreds. There are 3 groups. $1200 \div 400 = 3$</p>	<p>Reason from known facts, based on understanding of unitising. Use knowledge of the inverse relationship to check.</p> <p>$3,000 \div 5 = 600$ $3,000 \div 50 = 60$ $3,000 \div 500 = 6$</p> <p>$5 \times 600 = 3,000$ $50 \times 60 = 3,000$ $500 \times 6 = 3,000$</p>
<p>Dividing up to four digits by a</p>	<p>Explore grouping using place value equipment.</p>	<p>Use place value equipment on a place value grid alongside short division.</p>	<p>Use short division for up to 4-digit numbers divided by a single digit.</p>

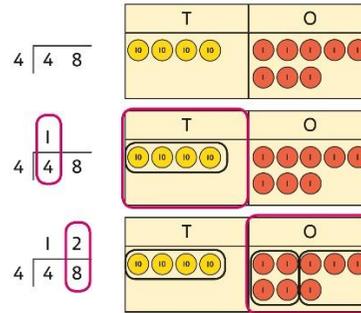
single digit using short division

$$268 \div 2 = ?$$

*There is 1 group of 2 hundreds.
There are 3 groups of 2 tens.
There are 4 groups of 2 ones.*

$$264 \div 2 = 134$$

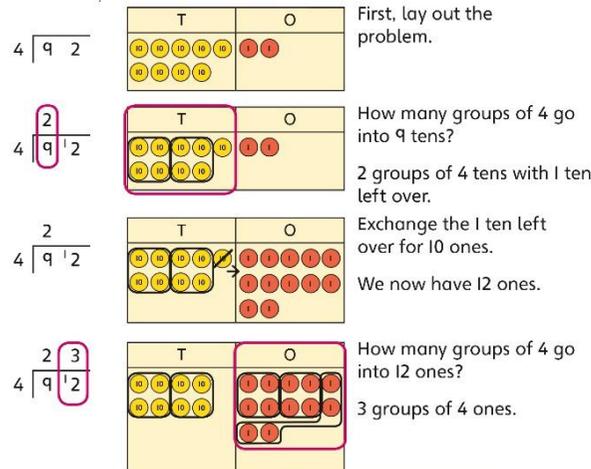
The model uses grouping.
A sharing model can also be used, although the model would need adapting.



Lay out the problem as a short division.

*There is 1 group of 4 in 4 tens.
There are 2 groups of 4 in 8 ones.*

Work with divisions that require exchange.



		0	5	5	6	
	7	3	8	3	9	42

$$3,892 \div 7 = 556$$

Use multiplication to check.

$$556 \times 7 = ?$$

$$6 \times 7 = 42$$

$$50 \times 7 = 350$$

$$500 \times 7 = 3500$$

$$3,500 + 350 + 42 = 3,892$$

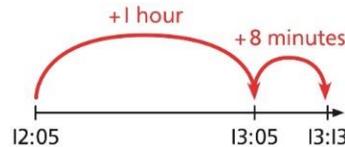
<p>Understanding remainders</p>	<p>Understand remainders using concrete versions of a problem.</p> <p><i>80 cakes divided into trays of 6.</i></p>  <p><i>80 cakes in total. They make 13 groups of 6, with 2 remaining.</i></p>	<p>Use short division and understand remainders as the last remaining 1s.</p> <div style="display: flex; align-items: flex-start;"> <div style="margin-right: 10px;"> $6 \overline{) 80}$ </div> <div style="margin-right: 10px;"> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td>T</td><td>O</td></tr> <tr><td>10 10 10 10</td><td></td></tr> <tr><td>10 10</td><td></td></tr> </table> </div> <div> <p>Lay out the problem as short division.</p> </div> </div> <div style="display: flex; align-items: flex-start;"> <div style="margin-right: 10px;"> $6 \overline{) 8} \overset{1}{\text{r}2} 0$ </div> <div style="margin-right: 10px;"> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td>T</td><td>O</td></tr> <tr><td>10 10 10 10</td><td></td></tr> <tr><td>10 10</td><td></td></tr> </table> </div> <div> <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: flex-start;"> <div style="margin-right: 10px;"> $6 \overline{) 8} \overset{1}{\text{r}2} 0 \overset{3}{\text{r}2}$ </div> <div style="margin-right: 10px;"> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td>T</td><td>O</td></tr> <tr><td>10 10</td><td>10 10 10 10 10 10 10 10 10 10</td></tr> </table> </div> <div> <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>	T	O	10 10 10 10		10 10		T	O	10 10 10 10		10 10		T	O	10 10	10 10 10 10 10 10 10 10 10 10	<p>In problem solving contexts, represent divisions including remainders with a bar model.</p> <div style="text-align: center;"> <table border="1" style="margin: 0 auto;"> <tr><td colspan="6" style="text-align: center;">683</td></tr> <tr><td>136</td><td>136</td><td>136</td><td>136</td><td>136</td><td>3</td></tr> </table> </div> <p>$683 = 136 \times 5 + 3$ $683 \div 5 = 136 \text{ r } 3$</p>	683						136	136	136	136	136	3												
T	O																																										
10 10 10 10																																											
10 10																																											
T	O																																										
10 10 10 10																																											
10 10																																											
T	O																																										
10 10	10 10 10 10 10 10 10 10 10 10																																										
683																																											
136	136	136	136	136	3																																						
<p>Dividing decimals by 10, 100 and 1,000</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> <table border="1" style="border-collapse: collapse; text-align: center; margin-bottom: 10px;"> <tr><td>T</td><td>O</td><td>Tth</td><td>Hth</td></tr> <tr><td>20</td><td>2</td><td></td><td></td></tr> </table> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td>T</td><td>O</td><td>Tth</td><td>Hth</td></tr> <tr><td></td><td>20</td><td>2</td><td></td></tr> </table> <p>32 is 3 tens and 2 ones. This is equivalent to 30 ones and 20 tenths. 30 ones divided by 10 is 3 ones. 20 tenths divided by 10 is 2 tenths. 32 divided by 10 is 3.2.</p>	T	O	Tth	Hth	20	2			T	O	Tth	Hth		20	2		<p>Understand the movement of digits on a place value grid.</p> <table border="1" style="border-collapse: collapse; text-align: center; margin-bottom: 10px;"> <tr><td>O</td><td>Tth</td><td>Hth</td><td>Thth</td></tr> <tr><td>0</td><td>8</td><td>5</td><td></td></tr> <tr><td>0</td><td>0</td><td>8</td><td>5</td></tr> </table> <p>$0.85 \div 10 = 0.085$</p> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td>O</td><td>Tth</td><td>Hth</td><td>Thth</td></tr> <tr><td>8</td><td>5</td><td></td><td></td></tr> <tr><td>0</td><td>0</td><td>8</td><td>5</td></tr> </table> <p>$8.5 \div 100 = 0.085$</p>	O	Tth	Hth	Thth	0	8	5		0	0	8	5	O	Tth	Hth	Thth	8	5			0	0	8	5
T	O	Tth	Hth																																								
20	2																																										
T	O	Tth	Hth																																								
	20	2																																									
O	Tth	Hth	Thth																																								
0	8	5																																									
0	0	8	5																																								
O	Tth	Hth	Thth																																								
8	5																																										
0	0	8	5																																								

<p>Understanding the relationship between fractions and division</p>	<p>Use sharing to explore the link between fractions and division.</p> <p><i>1 whole shared between 3 people. 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>  $1 \div 3 = \frac{1}{3}$	<p>Use the link between division and fractions to calculate divisions.</p> $5 \div 4 = \frac{5}{4} = 1\frac{1}{4}$ $11 \div 4 = \frac{11}{4} = 2\frac{3}{4}$
-----------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------

Year 6

	Concrete	Pictorial	Abstract																																																																																																										
<p>Year 6 Addition</p>																																																																																																													
<p>Comparing and selecting efficient methods</p>	<p>Represent 7-digit numbers on a place value grid and use this to support thinking and mental methods.</p> <table border="1" data-bbox="353 1085 927 1157"> <thead> <tr> <th>M</th> <th>HTh</th> <th>TTh</th> <th>Th</th> <th>H</th> <th>T</th> <th>O</th> </tr> </thead> <tbody> <tr> <td>●●</td> <td>●●●●</td> <td>●</td> <td>●</td> <td>●●●</td> <td></td> <td>●</td> </tr> </tbody> </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> <div style="display: flex; justify-content: space-around; align-items: center;"> <div data-bbox="963 1181 1198 1284"> <p style="text-align: center;">?</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>40,365</td><td>3,572</td></tr> </table> </div> <div data-bbox="1299 1165 1523 1348"> <table border="1" style="text-align: center;"> <thead> <tr> <th></th> <th>TTh</th> <th>Th</th> <th>H</th> <th>T</th> <th>O</th> </tr> </thead> <tbody> <tr> <td></td> <td>4</td> <td>0</td> <td>3</td> <td>6</td> <td>5</td> </tr> <tr> <td>+</td> <td></td> <td>3</td> <td>5</td> <td>7</td> <td>2</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> </div> </div>	40,365	3,572		TTh	Th	H	T	O		4	0	3	6	5	+		3	5	7	2													<p>Use column addition where mental methods are not efficient. Recognise common errors with column addition.</p> <p>$17,877 + 4,012 = ?$</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <table border="1" data-bbox="1556 1157 1814 1364" style="text-align: center;"> <thead> <tr> <th></th> <th>TTh</th> <th>Th</th> <th>H</th> <th>T</th> <th>O</th> </tr> </thead> <tbody> <tr> <td></td> <td>1</td> <td>7</td> <td>8</td> <td>7</td> <td>7</td> </tr> <tr> <td>+</td> <td>4</td> <td>0</td> <td>1</td> <td>2</td> <td></td> </tr> <tr> <td></td> <td>5</td> <td>7</td> <td>9</td> <td>9</td> <td>7</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <table border="1" data-bbox="1870 1157 2128 1364" style="text-align: center;"> <thead> <tr> <th></th> <th>TTh</th> <th>Th</th> <th>H</th> <th>T</th> <th>O</th> </tr> </thead> <tbody> <tr> <td></td> <td>1</td> <td>7</td> <td>8</td> <td>7</td> <td>7</td> </tr> <tr> <td>+</td> <td></td> <td>4</td> <td>0</td> <td>1</td> <td>2</td> </tr> <tr> <td></td> <td>2</td> <td>1</td> <td>8</td> <td>8</td> <td>9</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> </div>		TTh	Th	H	T	O		1	7	8	7	7	+	4	0	1	2			5	7	9	9	7								TTh	Th	H	T	O		1	7	8	7	7	+		4	0	1	2		2	1	8	8	9						
M	HTh	TTh	Th	H	T	O																																																																																																							
●●	●●●●	●	●	●●●		●																																																																																																							
40,365	3,572																																																																																																												
	TTh	Th	H	T	O																																																																																																								
	4	0	3	6	5																																																																																																								
+		3	5	7	2																																																																																																								
	TTh	Th	H	T	O																																																																																																								
	1	7	8	7	7																																																																																																								
+	4	0	1	2																																																																																																									
	5	7	9	9	7																																																																																																								
	TTh	Th	H	T	O																																																																																																								
	1	7	8	7	7																																																																																																								
+		4	0	1	2																																																																																																								
	2	1	8	8	9																																																																																																								

Use bar model and number line representations to model addition in problem-solving and measure contexts.



Which method has been completed accurately?

What mistake has been made?

Column methods are also used for decimal additions where mental methods are not efficient.

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

Selecting mental methods for larger numbers where appropriate

Represent 7-digit numbers on a place value grid and use this to support thinking and mental methods.

M	HTh	TTh	Th	H	T	O
••	•••••	•	•	•••		•

$$2,411,301 + 500,000 = ?$$

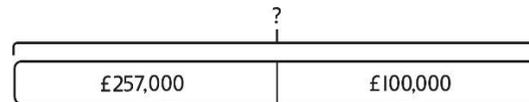
This would be 5 more counters in the HTh place.

So, the total is 2,911,301.

$$2,411,301 + 500,000 = 2,911,301$$

Use a bar model to support thinking in addition problems.

$$257,000 + 99,000 = ?$$



I added 100 thousands then subtracted 1 thousand.

257 thousands + 100 thousands = 357 thousands

$$257,000 + 100,000 = 357,000$$

$$357,000 - 1,000 = 356,000$$

$$\text{So, } 257,000 + 99,000 = 356,000$$

Use place value and unitising to support mental calculations with larger numbers.

$$195,000 + 6,000 = ?$$

$$195 + 5 + 1 = 201$$

195 thousands + 6 thousands = 201 thousands

$$\text{So, } 195,000 + 6,000 = 201,000$$

Understanding order of

Use equipment to model different interpretations of a calculation with more

Model calculations using a bar model to demonstrate the correct order of operations in multi-step calculations.

Understand the correct order of operations in calculations without brackets.

operations in calculations

than one operation. Explore different results.

$3 \times 5 - 2 = ?$

$3 \times (5 - 2)$
 $\downarrow \quad \downarrow$
 $3 \times 3 = 9$

$(3 \times 5) - 2$
 $\downarrow \quad \downarrow$
 $15 - 2 = 13$

This can be written as: $16 \times 4 + 16 \times 6$

$16 \times 4 + 16 \times 6$
 $64 + 96 = 160$

Understand how brackets affect the order of operations in a calculation.

$4 + 6 \times 16$
 $4 + 96 = 100$

$(4 + 6) \times 16$
 $10 \times 16 = 160$

Year 6 Subtraction

Comparing and selecting efficient methods

Use counters on a place value grid to represent subtractions of larger numbers.

Th	H	T	O
●●	●●●●●●	●●●●●●	●●●●●●
	●	●●	●●●●

Compare subtraction methods alongside place value representations.

2,679

?		534	
---	--	-----	--

	Th	H	T	O
	2	6	7	9
-		5	3	4
	2	1	4	5

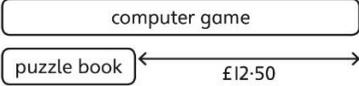
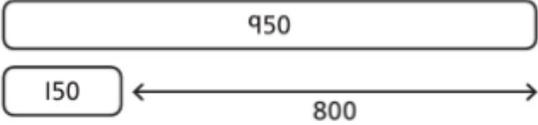
Th	H	T	O
●●	●●●●●●	●●●●●●	●●●●●●
	●	●●	●●●●

Compare and select methods. Use column subtraction when mental methods are not efficient. Use two different methods for one calculation as a checking strategy.

	Th	H	T	O
	2	6	7	9
-		5	3	4
	2	1	4	5

Use column subtraction for decimal problems, including in the context of measure.

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

		<p>Use a bar model to represent calculations, including 'find the difference' with two bars as comparison.</p> 	
<p>Subtracting mentally with larger numbers</p>		<p>Use a bar model to show how unitising can support mental calculations.</p> <p>$950,000 - 150,000$ <i>That is 950 thousands - 150 thousands</i></p>  <p><i>So, the difference is 800 thousands.</i> $950,000 - 150,000 = 800,000$</p>	<p>Subtract efficiently from powers of 10.</p> <p>$10,000 - 500 = ?$</p>
<p>Year 6 Multiplication</p>			

Multiplying up to a 4-digit number by a single digit number

Use equipment to explore multiplications.

Th	H	T	O

4 groups of 2,345

This is a multiplication:

$$4 \times 2,345$$

$$2,345 \times 4$$

Use place value equipment to compare methods.

Method 1

		3	2	5	5
		3	2	2	5
		3	2	2	5
		3	2	2	5
+		3	2	2	5
	1	2	9	0	0
	1		1	1	

Method 2

$$4 \times 3,000 = 12,000$$

$$4 \times 200 = 800$$

$$4 \times 20 = 80$$

$$4 \times 5 = 20$$

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

Understand area model and short multiplication.

Compare and select appropriate methods for specific multiplications.

Method 3

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

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

Method 4

		3	2	2	5
x					4
	1	2	9	0	0
	1		1	2	

Multiplying up to a 4-digit number by a 2-digit number

Use an area model alongside written multiplication.

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

$$4,200 + 630 + 105 = 4,935$$

		2	3	5
x			2	1
				5
			3	0
		2	0	0
		1	0	0
		6	0	0
	4	0	0	0
	4	9	3	5

1×5
 1×30
 1×200
 20×5
 20×30
 20×300
 21×235

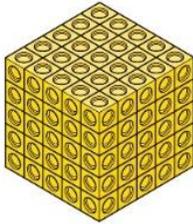
Use compact column multiplication with understanding of place value at all stages.

			2	3	5
x				2	1
			2	3	5
		4	7	0	0
		4	9	3	5

1×235
 20×235
 21×235

Using knowledge of factors and partitions to compare methods for multiplications

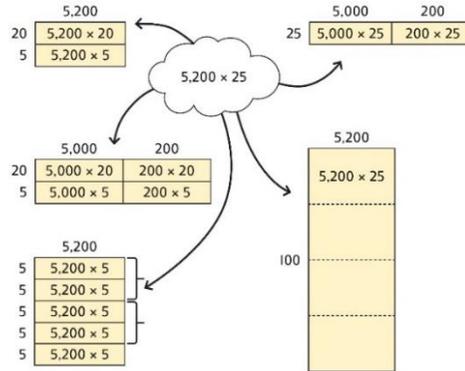
Use equipment to understand square numbers and cube numbers.



$$5 \times 5 = 5^2 = 25$$

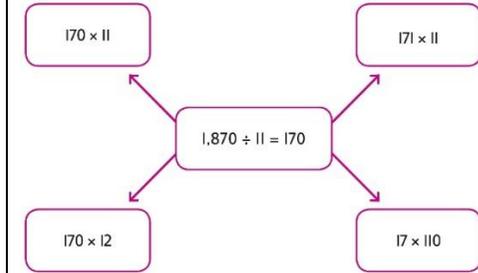
$$5 \times 5 \times 5 = 5^3 = 25 \times 5 = 125$$

Compare methods visually using an area model. Understand that multiple approaches will produce the same answer if completed accurately.



Represent and compare methods using a bar model.

Use a known fact to generate families of related facts.



Use factors to calculate efficiently.

$$15 \times 16$$

$$= 3 \times 5 \times 2 \times 8$$

$$= 3 \times 8 \times 2 \times 5$$

$$= 24 \times 10$$

$$= 240$$

Multiplying by 10, 100 and 1,000

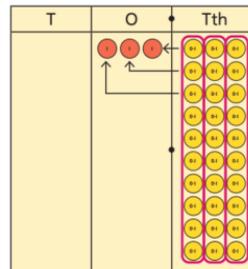
Use place value equipment to explore exchange in decimal multiplication.

$0.3 \times 10 = ?$
0.3 is 3 tenths.
10 x 3 tenths are 30 tenths.
30 tenths are equivalent to 3 ones.

T	O	Tth
		● ● ●

Represent 0.3.

Understand how the exchange affects decimal numbers on a place value grid.



Use knowledge of multiplying by 10, 100 and 1,000 to multiply by multiples of 10, 100 and 1,000.

$$8 \times 100 = 800$$

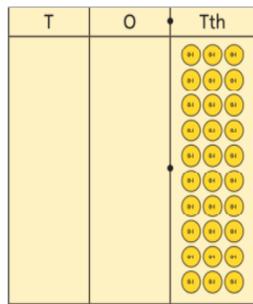
$$8 \times 300 = 800 \times 3$$

$$= 2,400$$

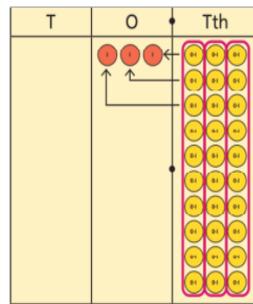
$$2.5 \times 10 = 25$$

$$2.5 \times 20 = 2.5 \times 10 \times 2$$

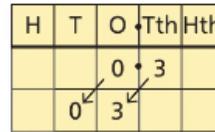
$$= 50$$



Multiply by 10.



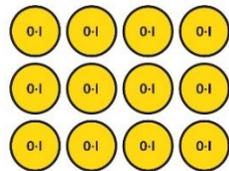
Exchange each group of ten-tenths.



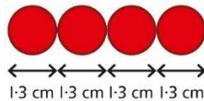
$$0.3 \times 10 = 3$$

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.



$$4 \times 1 \text{ cm} = 4 \text{ cm}$$

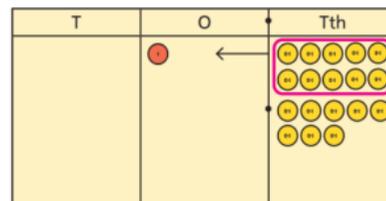
$$4 \times 0.3 \text{ cm} = 1.2 \text{ cm}$$

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

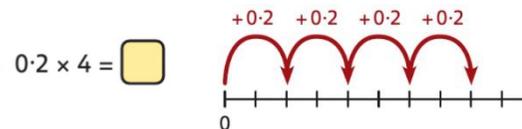
Represent calculations on a place value grid.

$$6 \times 3 = 18$$

$$6 \times 0.3 = 1.8$$



Understand the link between multiplying decimals and repeated addition.



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:

$$1.8 \times 4 = ?$$

$$18 \times 0.4 = ?$$

$$180 \times 0.4 = ?$$

$$18 \times 0.04 = ?$$

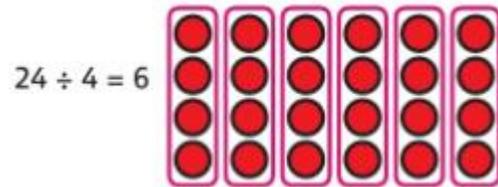
Use a place value grid to understand the effects of multiplying decimals.

	H	T	O	Tth	Hth
2×3			6		
0.2×3			0	6	
0.02×3					

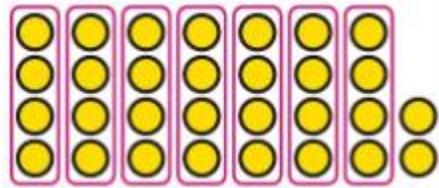
**Year 6
Division**

**Understanding
factors**

Use equipment to explore different factors of a number.



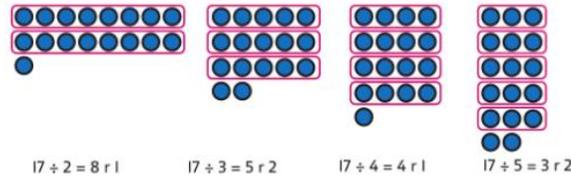
$$24 \div 4 = 6$$



$$30 \div 4 = 7 \text{ remainder } 2$$

4 is a factor of 24 but is not a factor of 30.

Recognise prime numbers as numbers having exactly two factors. Understand the link with division and remainders.



$$17 \div 2 = 8 \text{ r } 1$$

$$17 \div 3 = 5 \text{ r } 2$$

$$17 \div 4 = 4 \text{ r } 1$$

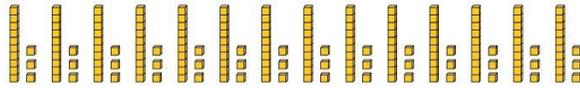
$$17 \div 5 = 3 \text{ r } 2$$

Recognise and know primes up to 100. Understand that 2 is the only even prime, and that 1 is not a prime number.

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

Dividing by a 2-digit number using long division

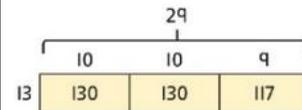
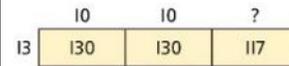
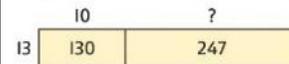
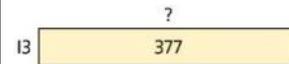
Use equipment to build numbers from groups.



182 divided into groups of 13.
There are 14 groups.

Use an area model alongside written division to model the process.

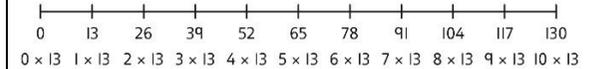
$$377 \div 13 = ?$$



$$377 \div 13 = 29$$

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

$$377 \div 13 = ?$$



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

$$377 \div 13 = 29$$

A slightly different layout may be used, with the division completed above rather than at the side.

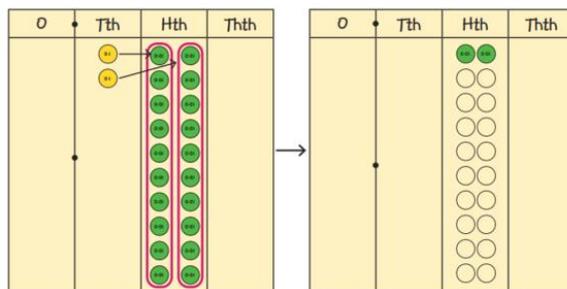
$$\begin{array}{r} 3 \\ 21 \overline{) 798} \\ - 630 \\ \hline 168 \end{array}$$

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

Divisions with a remainder explored in problem-solving contexts.

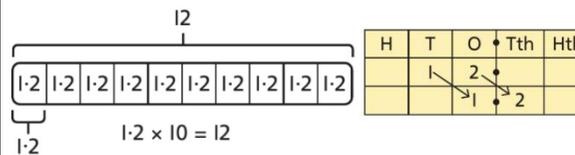
Dividing by 10, 100 and 1,000

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.

$$12 \div 20 = ?$$

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

$$40 \div 50 = \square$$

$$40 \rightarrow \boxed{\div 10} \rightarrow \boxed{\div 5} \rightarrow ?$$

$$40 \rightarrow \boxed{\div 5} \rightarrow \boxed{\div 10} \rightarrow ?$$

$$40 \div 5 = 8$$

$$8 \div 10 = 0.8$$

So, $40 \div 50 = 0.8$

<p>Dividing decimals</p>	<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> $4 \times 2 = 8$ $8 \div 4 = 2$ So, $4 \times 0.2 = 0.8$ $0.8 \div 4 = 0.2$ </p>	<p>Use short division to divide decimals with up to 2 decimal places.</p> $\begin{array}{r} . \\ 8 \overline{) 4.24} \\ \underline{0 } \\ 8 \overline{) 4.24} \\ \underline{0 5} \\ 8 \overline{) 4.24} \\ \underline{0 53} \\ 8 \overline{) 4.24} \end{array}$