



The Croft Primary School Calculation Policy



This calculation policy is designed in line with the National Curriculum to develop progression in calculation (addition, subtraction, multiplication and division) skills across the school. The consistent use of a CPA (concrete, pictorial, abstract) approach supports children in developing mastery across all of the operations in an efficient and reliable way. This policy aims to develop children's confidence in their understanding of both written and mental methods.

KEY STAGE 1

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

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

Addition and subtraction: Children first learn to connect addition and subtraction with counting, but they soon develop two very important skills: an understanding of parts and wholes, and an understanding of unitising 10s, to develop efficient and effective calculation strategies based on known number bonds and an increasing awareness of place value. Addition and subtraction are taught in a way that is interlinked to highlight the link between the two operations. A key idea is that children will select methods and approaches based on their number sense. For example, in Year 1, when faced with $15 - 3$ and $15 - 13$, they will adapt their ways of approaching the calculation appropriately. The teaching should always emphasise the importance of mathematical thinking to ensure accuracy and flexibility of approach, and the importance of using known number facts to harness their recall of bonds within 20 to support both addition and subtraction methods.

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

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

They learn how multiplication and division can be related to repeated addition and repeated subtraction to find the answer to the calculation. In this key stage, it is vital that children explore and experience a variety of strong images and manipulative representations of equal groups, including concrete experiences as well as abstract calculations.

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

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

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

LOWER KEY STAGE 2

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

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

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

In Year 4, the steps are shown without such fine detail, although children should continue to build their understanding with a secure basis in place value. In subtraction, children will need to develop their understanding of exchange as they may need to exchange across one or two columns. By the end of Year 4, children should have developed fluency in column methods alongside a deep understanding, which will allow them to progress confidently in upper Key Stage 2.

Multiplication and division: Children build a solid grounding in times-tables, understanding the multiplication and division facts in tandem. As such, they should be as confident knowing that 35 divided by 7 is 5 as knowing that 5 times 7 is 35. Children develop key skills to support multiplication methods: unitising, commutativity, and how to use partitioning effectively. Unitising allows children to use known facts to multiply and divide multiples of 10 and 100 efficiently. Commutativity gives children flexibility in applying known facts to calculations and problem solving. An understanding of partitioning allows children to extend their skills to multiplying and dividing 2- and 3-digit numbers by a single digit. Children develop column methods to support multiplications in these cases. For successful division, children will need to make choices about how to partition. For example, to divide 423 by 3, it is effective to partition 423 into 300, 120 and 3, as these can be divided by 3 using known facts. Children will also need to understand the concept of remainder, in terms of a given calculation and in terms of the context of the problem.

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

in Year 3, children develop an understanding of how to add and subtract fractions with the same denominator and find complements to the whole. This is developed alongside an understanding of fractions as numbers, including fractions greater than 1. In Year 4, children begin to work with fractions greater than 1. Decimals are introduced, as tenths in Year 3 and then as hundredths in Year 4. Children develop an understanding of decimals in terms of the relationship with fractions, with dividing by 10 and 100, and also with place value.

UPPER KEY STAGE 2

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

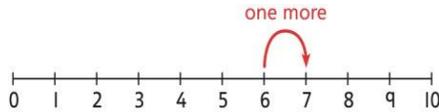
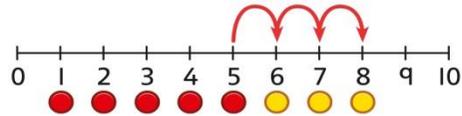
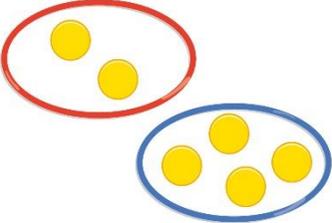
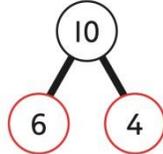
Key language: decimal, column methods, exchange, partition, mental method, ten thousand, hundred thousand, million, factor, multiple, prime number, square number, cube number

Addition and subtraction: Children build on their column methods to add and subtract numbers with up to seven digits, and they adapt the methods to calculate efficiently and effectively with decimals, ensuring understanding of place value at every stage.
Children compare and contrast methods, and they select mental methods or jottings where appropriate and where these are more likely to be efficient or accurate when compared with formal column methods.
Bar models are used to represent the calculations required to solve problems and may indicate where efficient methods can be chosen.

Multiplication and division: Building on their understanding, children develop methods to multiply up to 4-digit numbers by single-digit and 2-digit numbers.
Children develop column methods with an understanding of place value, and they continue to use the key skill of unitising to multiply and divide by 10, 100 and 1,000.
Written division methods are introduced and adapted for division by single-digit and 2-digit numbers and are understood alongside the area model and place value. In Year 6, children develop a secure understanding of how division is related to fractions.
Multiplication and division of decimals are also introduced and refined in Year 6.

Fractions: Children find fractions of amounts, multiply a fraction by a whole number and by another fraction, divide a fraction by a whole number, and add and subtract fractions with different denominators. Children become more confident working with improper fractions and mixed numbers and can calculate with them.
Understanding of decimals with up to 3 decimal places is built through place value and as fractions, and children calculate with decimals in the context of measure as well as in pure arithmetic.
Children develop an understanding of percentages in relation to hundredths, and they understand how to work with common percentages: 50%, 25%, 10% and 1%.

Year 1 - Addition

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

Knowing and finding number bonds within 10

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



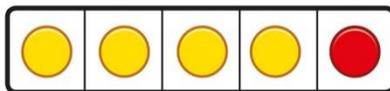
$$3 + 4 = 7$$



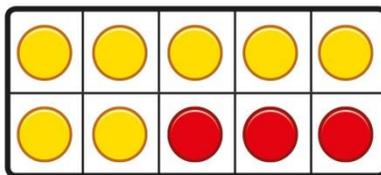
$$6 = 2 + 4$$

Knowing and finding number bonds within 10

Use five and ten frames to represent key number bonds.



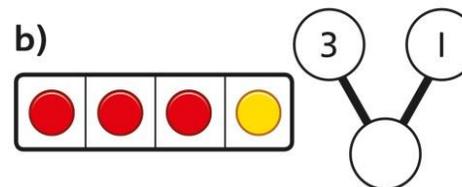
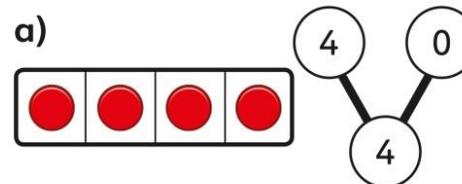
$$5 = 4 + 1$$



$$10 = 7 + 3$$

Knowing and finding number bonds within 10

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

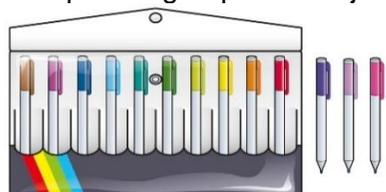


$$4 + 0 = 4$$

$$3 + 1 = 4$$

Understanding teen numbers as a complete 10 and some more

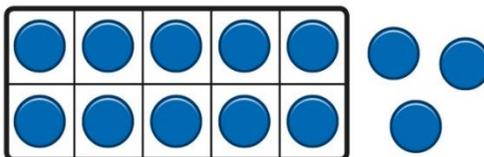
Complete a group of 10 objects and count more.



13 is 10 and 3 more.

Understanding teen numbers as a complete 10 and some more

Use a ten frame to support understanding of a complete 10 for teen numbers.



13 is 10 and 3 more.

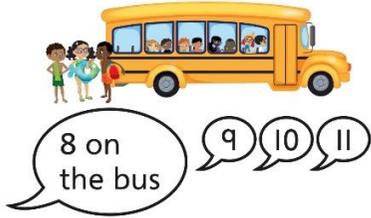
Understanding teen numbers as a complete 10 and some more.

1 ten and 3 ones equal 13.

$$10 + 3 = 13$$

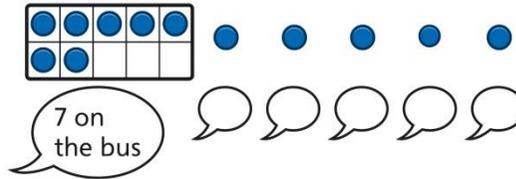
Adding by counting on

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



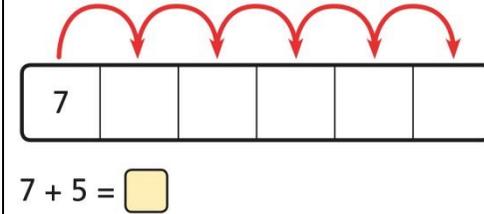
Adding by counting on

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



Adding by counting on

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

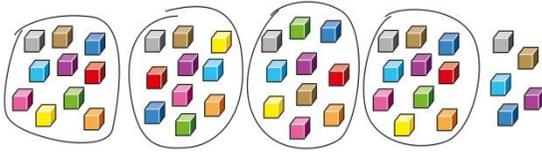


Year 2 - Addition

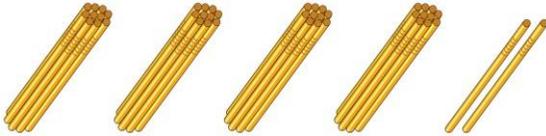
Concrete

Understanding 10s and 1s

Group objects into 10s and 1s.



Bundle objects such as straws to understand unitising of 10s.



Adding 10s

Use known bonds and unitising to add 10s.



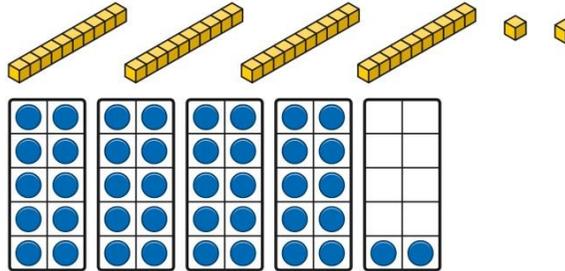
I know that $4 + 3 = 7$.

So, I know that 4 tens add 3 tens is 7 tens.

Pictorial

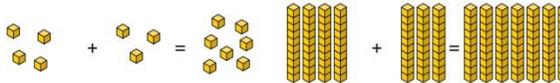
Understanding 10s and 1s

Understand 10s and 1s equipment, and link with visual representations on ten frames.



Adding 10s

Use known bonds and unitising to add 10s.



I know that $4 + 3 = 7$.

So, I know that 4 tens add 3 tens is 7 tens.

Abstract

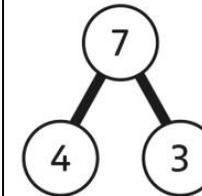
Understanding 10s and 1s

Represent numbers on a place value grid, using equipment or numerals.

Tens	Ones
3	2

Adding 10s

Use known bonds and unitising to add 10s.



$4 + 3 = \square$

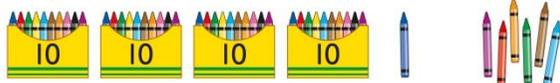
$4 + 3 = 7$

$4 \text{ tens} + 3 \text{ tens} = 7 \text{ tens}$

$40 + 30 = 70$

Adding a 1-digit number to a 2-digit number (not bridging a 10)

Add the 1s to find the total. Use known bonds within 10.



41 is 4 tens and 1 one.
41 add 6 ones is 4 tens and 7 ones.

This can also be done by placing objects in a place value grid.

Adding a 1-digit number to a 2-digit number (not bridging a 10)

Add the 1s.



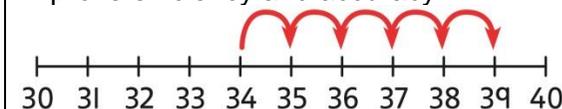
34 is 3 tens and 4 ones.
4 ones and 5 ones are 9 ones.
The total is 3 tens and 9 ones.

T	O

Adding a 1-digit number to a 2-digit number (not bridging a 10)

Add the 1s.

Understand the link between counting on and using known number facts. Children should be encouraged to use known number bonds to improve efficiency and accuracy.



This can be represented horizontally or vertically.

$$34 + 5 = 39$$

or

T	O
3	4
+	5
	9

Adding a 1-digit number to a 2-digit number (bridging 10)

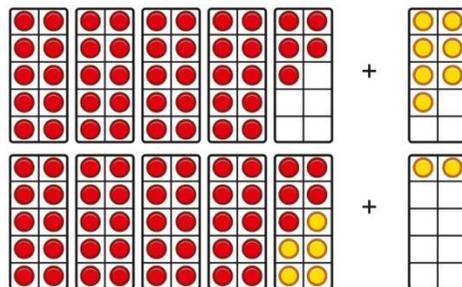
Complete a 10 using number bonds.



There are 4 tens and 5 ones.
I need to add 7. I will use 5 to complete a 10, then add 2 more.

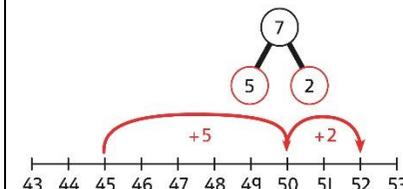
Adding a 1-digit number to a 2-digit number (bridging 10)

Complete a 10 using number bonds.



Adding a 1-digit number to a 2-digit number (bridging 10)

Complete a 10 using number bonds.

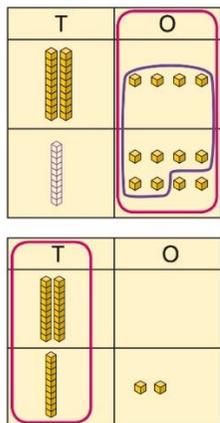


$$7 = 5 + 2$$

$$45 + 5 + 2 = 52$$

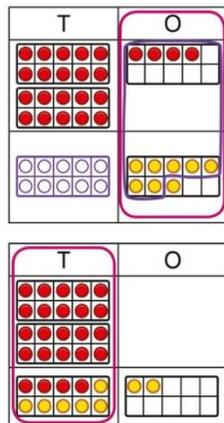
Adding a 1-digit number to a 2-digit number using exchange

Exchange 10 ones for 1 ten.



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

Exchange 10 ones for 1 ten.



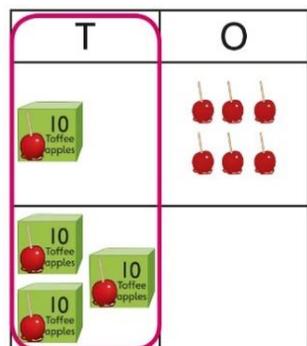
Adding a 1-digit number to a 2-digit number using exchange

Exchange 10 ones for 1 ten.



Adding a multiple of 10 to a 2-digit number using columns

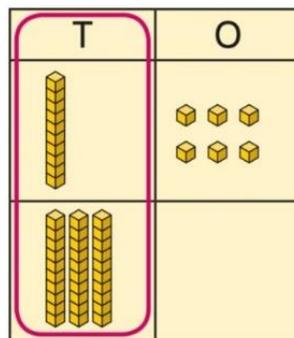
Add the 10s using a place value grid to support.



16 is 1 ten and 6 ones.
30 is 3 tens.
There are 4 tens and 6 ones in total.

Adding a multiple of 10 to a 2-digit number using columns

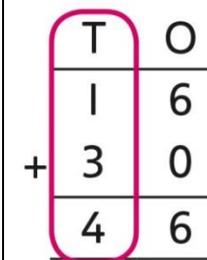
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Adding a multiple of 10 to a 2-digit number using columns

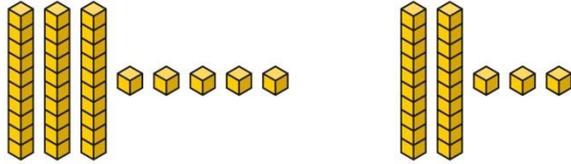
Add the 10s represented vertically. Children must understand how the method relates to unitising of 10s and place value.



1 + 3 = 4
1 ten + 3 tens = 4 tens
16 + 30 = 46

Adding two 2-digit numbers

Add the 10s and 1s separately.



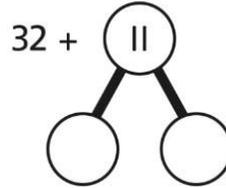
5 ones + 3 ones = 8 ones
There are 8 ones in total.

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

$$35 + 23 = 58$$

Adding two 2-digit numbers

Add the 10s and 1s separately. Use a part-whole model to support.



$$11 = 10 + 1$$

$$32 + 10 = 42$$

$$42 + 1 = 43$$

$$32 + 11 = 43$$

Adding two 2-digit numbers

Add the 10s and the 1s separately, bridging 10s where required.

T	O
3	2
+ 1	4
<hr/>	
	6

T	O
3	2
+ 1	4
<hr/>	
4	6

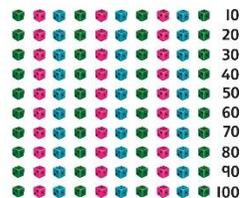
Year 3 - Addition

Concrete

Understanding 100s

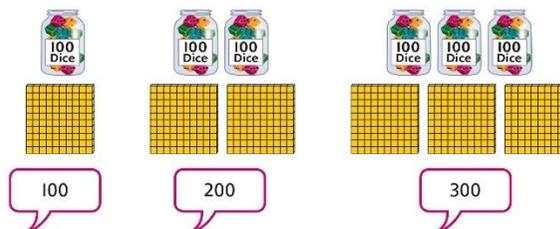
Understand the cardinality of 100, and the link with 10 tens.

Use cubes to place into groups of 10 tens.



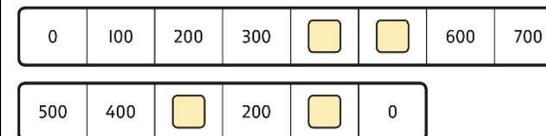
Pictorial

Unitise 100 and count in steps of 100.



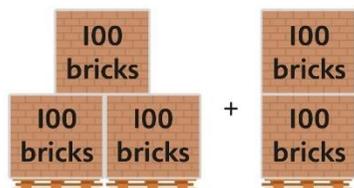
Abstract

Represent steps of 100 on a number line and a number track and count up to 1,000 and back to 0.



Adding 100s

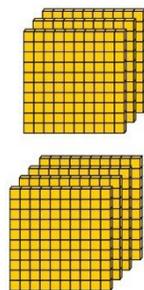
Use known facts and unitising to add multiples of 100.



$3 + 2 = 5$
 3 hundreds + 2 hundreds = 5 hundreds
 $300 + 200 = 500$

Adding 100s

Use known facts and unitising to add multiples of 100.

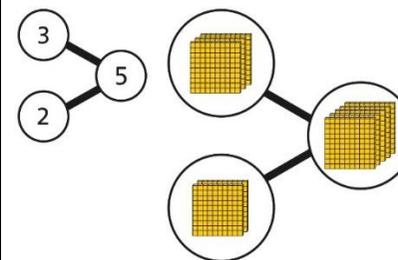


$3 + 4 = 7$
 3 hundreds + 4 hundreds = 7 hundreds
 $300 + 400 = 700$

Adding 100s

Use known facts and unitising to add multiples of 100.

Use a part-whole model to support unitising.



$3 + 2 = 5$
 $300 + 200 = 500$

3-digit number + 1s, no exchange or bridging

Use number bonds to add the 1s.



$214 + 4 = ?$

Now there are 4 + 4 ones in total.

$4 + 4 = 8$

$214 + 4 = 218$

3-digit number + 1s, no exchange or bridging

Use number bonds to add the 1s.

H	T	O
2	4	9

Use number bonds to add the 1s.
 $5 + 4 = 9$

$245 + 4$

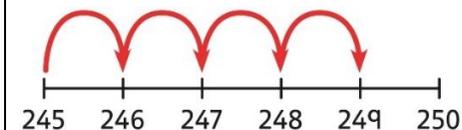
$5 + 4 = 9$

$245 + 4 = 249$

3-digit number + 1s, no exchange or bridging

Understand the link with counting on.

$245 + 4$



Use number bonds to add the 1s and understand that this is more efficient and less prone to error.

$245 + 4 = ?$

I will add the 1s.

$5 + 4 = 9$

So, $245 + 4 = 249$

3-digit number + 1s with exchange

Understand that when the 1s sum to 10 or more, this requires an exchange of 10 ones for 1 ten.

Children should explore this using unitised objects or physical apparatus.

3-digit number + 1s with exchange

Exchange 10 ones for 1 ten where needed. Use a place value grid to support the understanding.

H	T	O

H	T	O

H	T	O

H	T	O

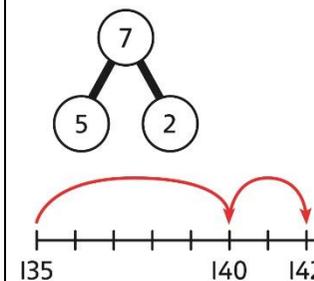


H	T	O

$135 + 7 = 142$

3-digit number + 1s with exchange

Understand how to bridge by partitioning to the 1s to make the next 10.



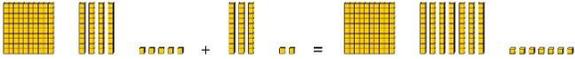
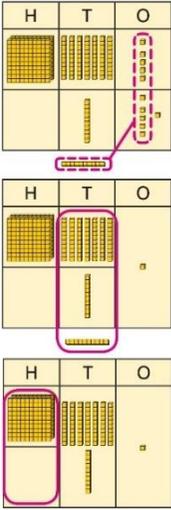
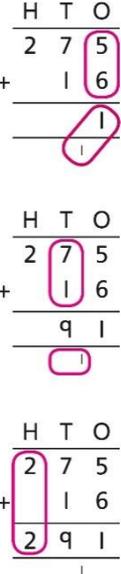
$135 + 7 = ?$

$135 + 5 + 2 = 142$

Ensure that children understand how to add 1s bridging a 100.

$198 + 5 = ?$

$198 + 2 + 3 = 203$

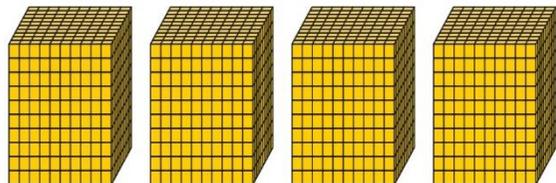
<p>3-digit number + 2-digit number, no exchange required</p> <p>Use place value equipment to make and combine groups to model addition.</p> 	<p>3-digit number + 2-digit number, no exchange required</p> <p>Use a place value grid to organise thinking and adding of 1s, then 10s.</p>	<p>3-digit number + 2-digit number, no exchange required</p> <p>Use the vertical column method to represent the addition. Children must understand how this relates to place value at each stage of the calculation.</p>
<p>3-digit number + 2-digit number, exchange required</p> <p>Use place value equipment to model addition and understand where exchange is required.</p> <p><i>Use place value counters to represent 154 + 72.</i></p> <p><i>Use this to decide if any exchange is required.</i></p> <p><i>There are 5 tens and 7 tens. That is 12 tens so I will exchange.</i></p>	<p>Represent the required exchange on a place value grid using equipment.</p> <p>$275 + 16 = ?$</p>  <p>$275 + 16 = 291$</p> <p>Note: In this example, a mental method may be more efficient. The numbers for the example calculation have been chosen to allow children to visualise the concept and see how the method relates to place value. Children should be encouraged at every stage to select methods that are accurate and efficient.</p>	<p>Use a column method with exchange. Children must understand how the method relates to place value at each stage of the calculation.</p>  <p>$275 + 16 = 291$</p>

Year 4 - Addition

Concrete

Understanding numbers to 10,000

Use place value equipment to understand the place value of 4-digit numbers.



4 thousands equal 4,000.

1 thousand is equal to 10 hundreds.

Pictorial

Understanding numbers to 10,000

Represent numbers using place value counters once children understand the relationship between 1,000s and 100s.

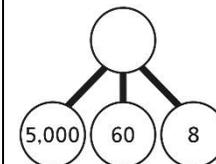


$$2,000 + 500 + 40 + 2 = 2,542$$

Abstract

Understanding numbers to 10,000

Understand partitioning of 4-digit numbers, including numbers with digits of 0.



$$5,000 + 60 + 8 = 5,068$$

Understand and read 4-digit numbers on a number line.



Choosing mental methods where appropriate

Apply unitising and known facts to support mental calculations.

Make 1,405 from place value equipment.

Add 2,000 by combining the 1,000s.

1 thousand + 2 thousands = 3 thousands

$$1,405 + 2,000 = 3,405$$

Choosing mental methods where appropriate

Apply unitising and known facts to support mental calculations.

Th	H	T	O

I can add the 100s mentally.

$$200 + 300 = 500$$

$$\text{So, } 4,256 + 300 = 4,556$$

Choosing mental methods where appropriate

Apply unitising and known facts to support mental calculations.

$$4,256 + 300 = ?$$

$$2 + 3 = 5$$

$$200 + 300 = 500$$

$$4,256 + 300 = 4,556$$

Column addition with exchange

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

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

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

Th	H	T	O
1000	900	0	5
0	700	70	7

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

Which columns will total 10 or more?

Column addition with exchange

Use place value equipment to model required exchanges.

Th	H	T	O
1000	900	0	5
0	700	70	7

Th	H	T	O
1000	900	70	12
0	700	70	7

Th	H	T	O
1000	1600	70	12
0	700	70	7

Th	H	T	O
1000	1600	140	19
0	700	70	7

Include examples that exchange in more than one column.

Column addition with exchange

Use a column method to add, including exchanges.

$$\begin{array}{r} \text{Th} \quad \text{H} \quad \text{T} \quad \text{O} \\ 1 \quad 5 \quad 5 \quad 4 \\ + 4 \quad 2 \quad 3 \quad 7 \\ \hline \end{array}$$

$$\begin{array}{r} \text{Th} \quad \text{H} \quad \text{T} \quad \text{O} \\ 1 \quad 5 \quad 5 \quad 4 \\ + 4 \quad 2 \quad 3 \quad 7 \\ \hline \quad \quad 9 \quad 1 \end{array}$$

$$\begin{array}{r} \text{Th} \quad \text{H} \quad \text{T} \quad \text{O} \\ 1 \quad 5 \quad 5 \quad 4 \\ + 4 \quad 2 \quad 3 \quad 7 \\ \hline 5 \quad 7 \quad 9 \quad 1 \end{array}$$

$$\begin{array}{r} \text{Th} \quad \text{H} \quad \text{T} \quad \text{O} \\ 1 \quad 5 \quad 5 \quad 4 \\ + 4 \quad 2 \quad 3 \quad 7 \\ \hline 5 \quad 7 \quad 9 \quad 1 \end{array}$$

Include examples that exchange in more than one column.

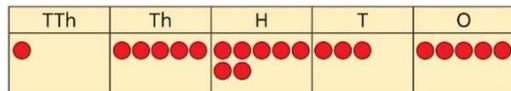
Year 5 - Addition

Concrete

Column addition with whole numbers

Use place value equipment to represent additions.

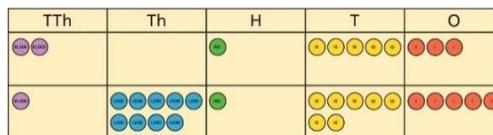
Add a row of counters onto the place value grid to show $15,735 + 4,012$.



Pictorial

Column addition with whole numbers

Represent additions, using place value equipment on a place value grid alongside written methods.



I need to exchange 10 tens for a 100.

$$\begin{array}{r}
 \text{TTh Th H T O} \\
 20153 \\
 + 19175 \\
 \hline
 39328
 \end{array}$$

Abstract

Column addition with whole numbers

Use column addition, including exchanges.

$$\begin{array}{r}
 \text{TTh Th H T O} \\
 19175 \\
 + 18417 \\
 \hline
 37592
 \end{array}$$

Adding tenths

Link measure with addition of decimals.

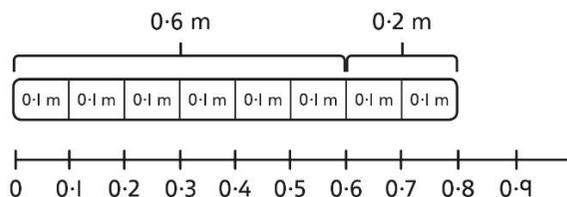
Two lengths of fencing are 0.6 m and 0.2 m.

How long are they when added together?



Adding tenths

Use a bar model with a number line to add tenths.



$$\begin{array}{l}
 0.6 + 0.2 = 0.8 \\
 6 \text{ tenths} + 2 \text{ tenths} = 8 \text{ tenths}
 \end{array}$$

Adding tenths

Understand the link with adding fractions.

$$\begin{array}{l}
 \frac{6}{10} + \frac{2}{10} = \frac{8}{10} \\
 6 \text{ tenths} + 2 \text{ tenths} = 8 \text{ tenths} \\
 0.6 + 0.2 = 0.8
 \end{array}$$

Adding decimals using column addition

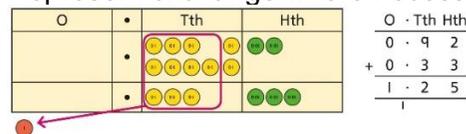
Use place value equipment to represent additions.

Show $0.23 + 0.45$ using place value counters.

Adding decimals using column addition

Use place value equipment on a place value grid to represent additions.

Represent exchange where necessary.



Adding decimals using column addition

Add using a column method, ensuring that children understand the link with place value.

$$\begin{array}{r}
 \text{O} \cdot \text{Tth Hth} \\
 0 \cdot 23 \\
 + 0 \cdot 45 \\
 \hline
 0 \cdot 68
 \end{array}$$

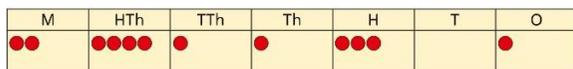
Include exchange where required, alongside an understanding of place value.

Year 6 - Addition

Concrete

Comparing and selecting efficient methods

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



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.



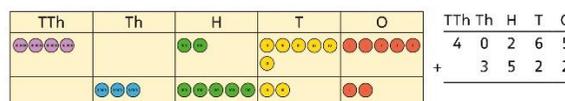
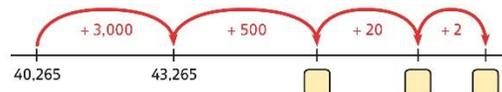
$2,411,301 + 500,000 = ?$

This would be 5 more counters in the HTh place.
So, the total is 2,911,301.

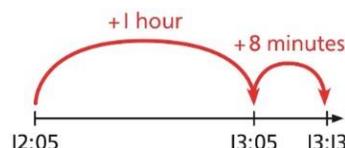
Pictorial

Comparing and selecting efficient methods

Discuss similarities and differences between methods, and choose efficient methods based on the specific calculation.
Compare written and mental methods alongside place value representations.



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



Selecting mental methods for larger numbers where appropriate

Use different representations to support thinking in addition problems.

$257,000 + 99,000 = ?$

I added 100 thousands then subtracted one thousand.

$257 \text{ thousands} + 100 \text{ thousands} = 357 \text{ thousands}$
 $- 1 \text{ thousand} = 356 \text{ thousand.}$

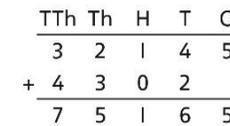
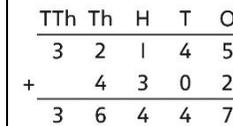
So, $257,000 + 99,000 = 356,000$

Abstract

Comparing and selecting efficient methods

Use column addition where mental methods are not efficient. Recognise common errors with column addition.

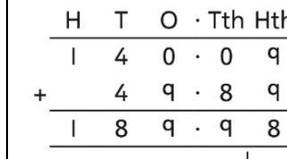
$32,145 + 4,302 = ?$



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.



Selecting mental methods for larger numbers where appropriate

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

$195,000 + 6,000 = ?$

$195 + 5 + 1 = 201$

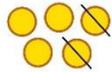
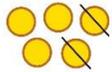
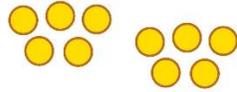
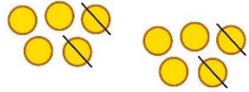
195 thousands + 6 thousands = 201 thousands

So, $195,000 + 6,000 = 201,000$

Understanding order of operations in calculations

Use equipment to model different interpretations of a calculation with more than one operation. Explore different results.

$3 \times 5 - 2 = ?$

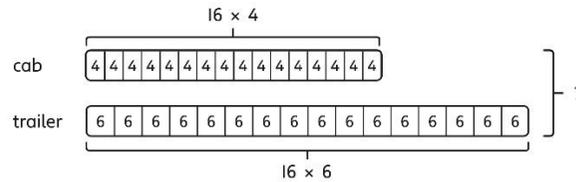


$$\begin{array}{c} 3 \times 5 - 2 \\ \downarrow \quad \downarrow \\ 3 \times 3 = 9 \end{array}$$

$$\begin{array}{c} 3 \times 5 - 2 \\ \downarrow \quad \downarrow \\ 15 - 2 = 13 \end{array}$$

Understanding order of operations in calculations

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



This can be written as: $16 \times 4 + 16 \times 6$
 $16 \times 4 + 16 \times 6$
 $64 + 96 = 160$

Understanding order of operations in calculations

Understand the correct order of operations in calculations without brackets.

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

$$\begin{array}{l} 4 + 6 \times 16 \\ 4 + 96 = 100 \end{array}$$

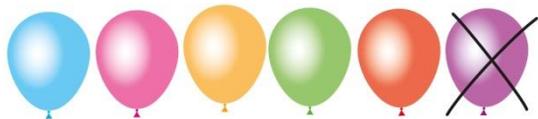
$$\begin{array}{l} (4 + 6) \times 16 \\ 10 \times 16 = 160 \end{array}$$

Year 1 - Subtraction

Concrete

Counting back and taking away

Children arrange objects and remove to find how many are left.

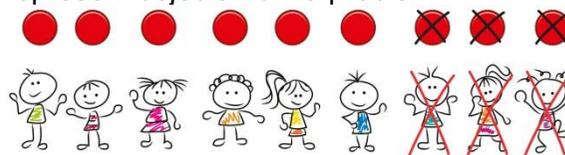


1 less than 6 is 5.
6 subtract 1 is 5.

Pictorial

Counting back and taking away

Children draw and cross out or use counters to represent objects from a problem.



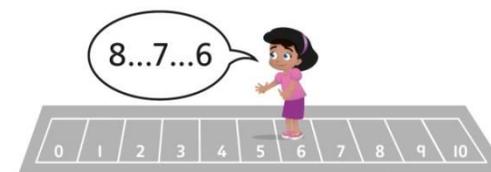
$$9 - \square = \square$$

There are children left.

Abstract

Counting back and taking away

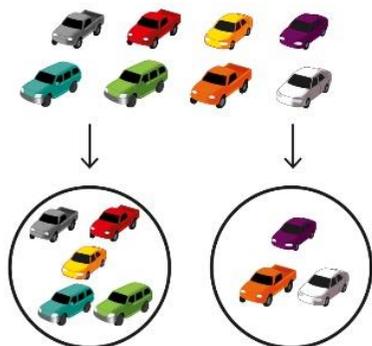
Children count back to take away and use a number line or number track to support the method.



$$9 - 3 = 6$$

Finding a missing part, given a whole and a part

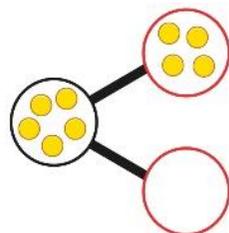
Children separate a whole into parts and understand how one part can be found by subtraction.



$$8 - 5 = ?$$

Finding a missing part, given a whole and a part

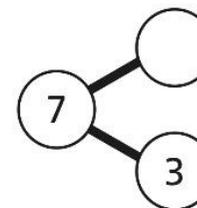
Children represent a whole and a part and understand how to find the missing part by subtraction.



$$5 - 4 = \square$$

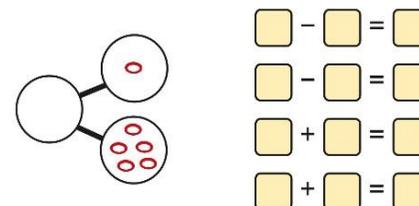
Finding a missing part, given a whole and a part

Children use a part-whole model to support the subtraction to find a missing part.



$$7 - 3 = ?$$

Children develop an understanding of the relationship between addition and subtraction facts in a part-whole model.



Finding the difference

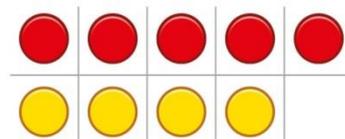
Arrange two groups so that the difference between the groups can be worked out.



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

Finding the difference

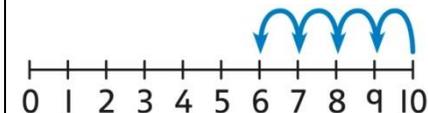
Represent objects using sketches or counters to support finding the difference.



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

Finding the difference

Children understand 'find the difference' as subtraction.

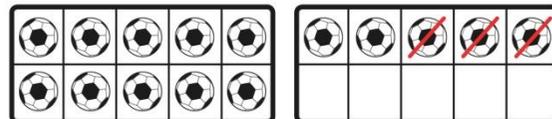


$10 - 4 = 6$
The difference between 10 and 6 is 4.

Subtraction within 20

Understand when and how to subtract 1s efficiently.

Use objects to subtract 1s from the total efficiently.



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

Subtraction within 20

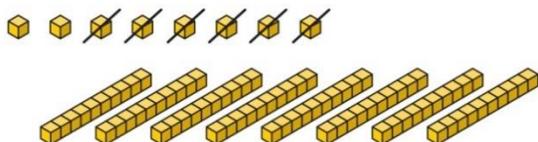
Understand how to use knowledge of bonds within 10 to subtract efficiently.

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

Year 2 - Subtraction

Subtracting multiples of 10

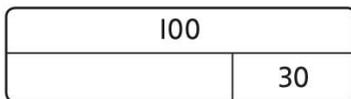
Use known number bonds and unitising to subtract multiples of 10.



8 subtract 6 is 2.
So, 8 tens subtract 6 tens is 2 tens.

Subtracting multiples of 10

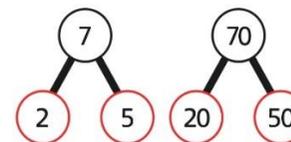
Use known number bonds and unitising to subtract multiples of 10.



$10 - 3 = 7$
So, 10 tens subtract 3 tens is 7 tens.

Subtracting multiples of 10

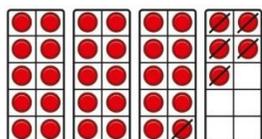
Use known number bonds and unitising to subtract multiples of 10.



7 tens subtract 5 tens is 2 tens.
 $70 - 50 = 20$

Subtracting a single-digit number bridging 10

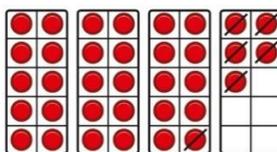
Bridge 10 by using known bonds.



$35 - 6$
I took away 5 counters, then 1 more.

Subtracting a single-digit number bridging 10

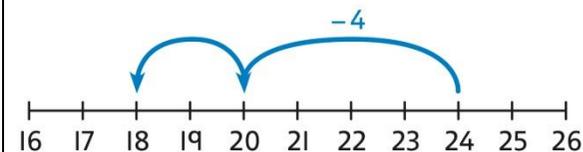
Bridge 10 by using known bonds.



$35 - 6$
First, I will subtract 5, then 1.

Subtracting a single-digit number bridging 10

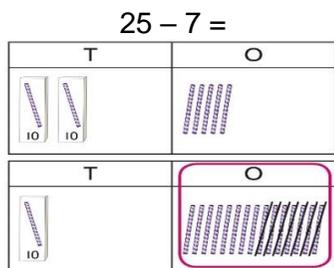
Bridge 10 by using known bonds.



$24 - 6 = ?$
 $24 - 4 = 20$
 $20 - 2 = 18$

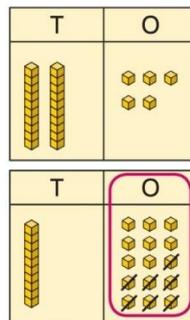
Subtracting a single-digit number using exchange

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

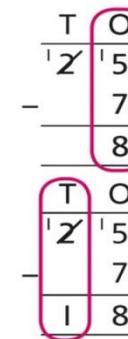


Subtracting a single-digit number using exchange

Exchange 1 ten for 10 ones.



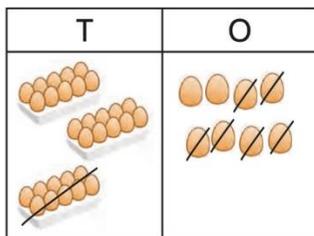
Exchange 1 ten for 10 ones.



Subtracting a 2-digit number using place value and columns

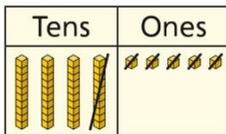
Subtract the 1s.
Then subtract the 10s.
This may be done in or out of a place value grid.

$$38 - 16 = 22$$



Subtracting a 2-digit number using place value and columns

Subtract the 1s.
Then subtract the 10s.
 $45 - 15 = 30$



Subtracting a 2-digit number using place value and columns

Using column subtraction.
Subtract the 1s.
Then subtract the 10s.

$$\begin{array}{r} \text{T} \quad \text{O} \\ 4 \quad 5 \\ - 1 \quad 2 \\ \hline 3 \end{array}$$

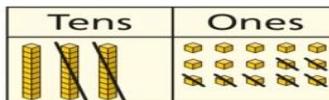
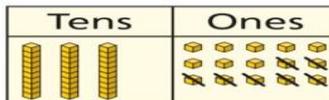
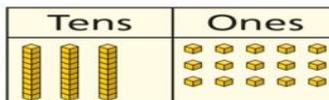
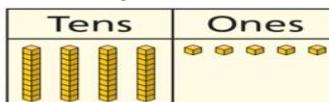
$$\begin{array}{r} \text{T} \quad \text{O} \\ 4 \quad 5 \\ - 1 \quad 2 \\ \hline 3 \quad 3 \end{array}$$

Subtracting a 2-digit number with exchange

Subtracting a 2-digit number with exchange

Exchange 1 ten for 10 ones. Then subtract the 1s.
Then subtract the 10s.

$$45 - 27 = ?$$



Subtracting a 2-digit number with exchange

Using column subtraction, exchange 1 ten for 10 ones. Then subtract the 1s. Then subtract the 10s.

$$\begin{array}{r} \text{T} \quad \text{O} \\ 4 \quad 5 \\ - 2 \quad 7 \\ \hline \end{array}$$

$$\begin{array}{r} \text{T} \quad \text{O} \\ \overset{3}{\cancel{4}} \quad \overset{15}{5} \\ - 2 \quad 7 \\ \hline \end{array}$$

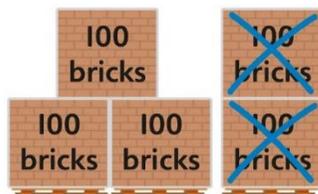
$$\begin{array}{r} \text{T} \quad \text{O} \\ \overset{3}{\cancel{4}} \quad \overset{15}{5} \\ - 2 \quad 7 \\ \hline 8 \end{array}$$

$$\begin{array}{r} \text{T} \quad \text{O} \\ \overset{3}{\cancel{4}} \quad \overset{15}{5} \\ - 2 \quad 7 \\ \hline 1 \quad 8 \end{array}$$

Year 3 - Subtraction

Subtracting 100s

Use known facts and unitising to subtract multiples of 100.

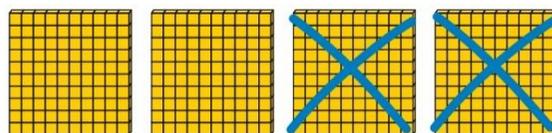


$$5 - 2 = 3$$

$$500 - 200 = 300$$

Subtracting 100s

Use known facts and unitising to subtract multiples of 100.

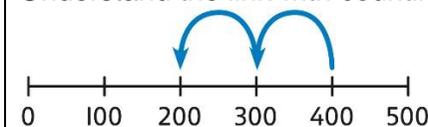


$$4 - 2 = 2$$

$$400 - 200 = 200$$

Subtracting 100s

Understand the link with counting back in 100s.



$$400 - 200 = 200$$

Use known facts and unitising as efficient and accurate methods.

I know that $7 - 4 = 3$. Therefore, I know that $700 - 400 = 300$.

3-digit number – 1s, no exchange

Use number bonds to subtract the 1s.



$$214 - 3 = ?$$



$$4 - 3 = 1$$

$$214 - 3 = 211$$

3-digit number – 1s, no exchange

Use number bonds to subtract the 1s.

H	T	O
3	1	9

$$319 - 4 = ?$$

H	T	O
3	1	5

$$9 - 4 = 5$$

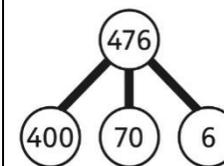
$$319 - 4 = 315$$

3-digit number – 1s, no exchange

Understand the link with counting back using a number line.

Use known number bonds to calculate mentally.

$$476 - 4 = ?$$



$$6 - 4 = 2$$

$$476 - 4 = 472$$

3-digit number – 1s, exchange or bridging required

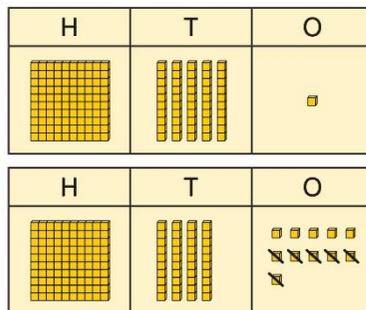
Understand why an exchange is necessary by exploring why 1 ten must be exchanged.

Use place value equipment.

3-digit number – 1s, exchange or bridging required

Represent the required exchange on a place value grid.

$$151 - 6 = ?$$



3-digit number – 1s, exchange or bridging required

Calculate mentally by using known bonds.

$$151 - 6 = ?$$

$$151 - 1 - 5 = 145$$

3-digit number – 10s, no exchange

Subtract the 10s using known bonds.



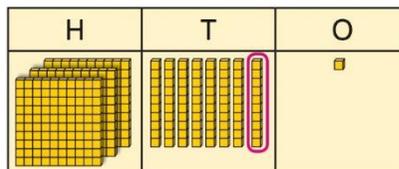
$$381 - 10 = ?$$

8 tens with 1 removed is 7 tens.

$$381 - 10 = 371$$

3-digit number – 10s, no exchange

Subtract the 10s using known bonds.



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

$$381 - 10 = 371$$

3-digit number – 10s, no exchange

Use known bonds to subtract the 10s mentally.

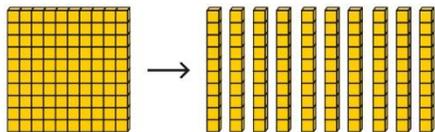
$$372 - 50 = ?$$

$$70 - 50 = 20$$

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

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

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



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

Represent the exchange on a place value grid using equipment.

$210 - 20 = ?$

H	T	O

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

H	T	O

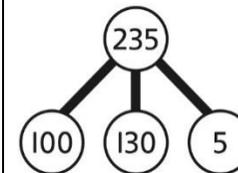
$210 - 20 = 190$

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

Understand the link with counting back on a number line.

Use flexible partitioning to support the calculation.

$235 - 60 = ?$



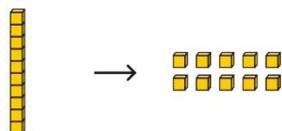
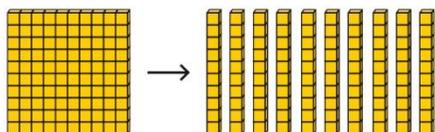
$$235 = 100 + 130 + 5$$

$$235 - 60 = 100 + 70 + 5$$

$$= 175$$

3-digit number – up to 3-digit number, exchange required

Use equipment to enact the exchange of 1 hundred for 10 tens, and 1 ten for 10 ones.



3-digit number – up to 3-digit number, exchange required

Model the required exchange on a place value grid.

$175 - 38 = ?$

H	T	O

I need to subtract 8 ones, so I will exchange a ten for 10 ones.

H	T	O

H	T	O

3-digit number – up to 3-digit number, exchange required

Use column subtraction to work accurately and efficiently.

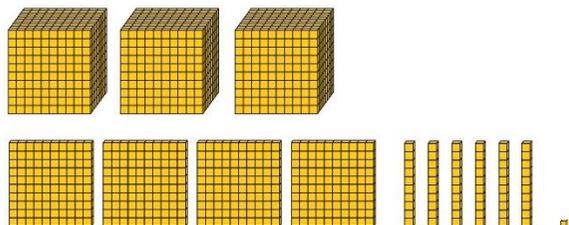
	H	T	O
	1	7	5
-		3	8
	1	3	7

$175 - 38 = 137$

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.

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?

Choosing mental methods where appropriate
Use place value grids to support mental methods where appropriate.

Th	H	T	O
1000 1000 1000 1000 1000 1000	100 100 100 100 100 100	10 10 10	10 10 10 10 10

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

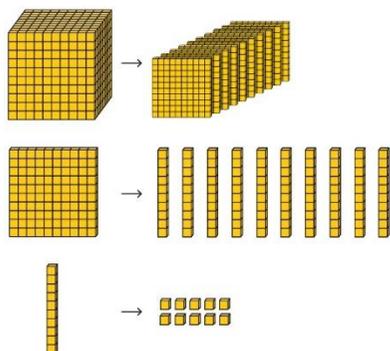
Choosing mental methods where appropriate
Use knowledge of place value and unitising to subtract mentally where appropriate.

$$3,501 - 2,000$$

3 thousands - 2 thousands = 1 thousand

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

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



Column subtraction with exchange Represent place value equipment on a place value grid to subtract, including exchanges where needed.

Th	H	T	O
1000	600	40	6
1000	600	40	6
1000	600	40	6
1000	600	40	6
1000	600	40	6

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

Th	H	T	O
1	2	5	0
-	4	2	0
			0

Th	H	T	O
1	2	5	0
-	4	2	0
		3	0

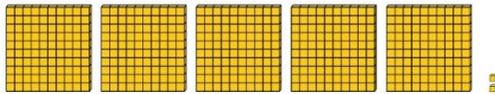
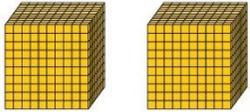
Th	H	T	O
1	2	5	0
-	4	2	0
	8	3	0

Th	H	T	O
1	2	5	0
-	4	2	0
	8	3	0

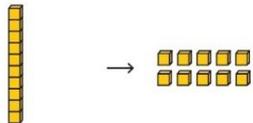
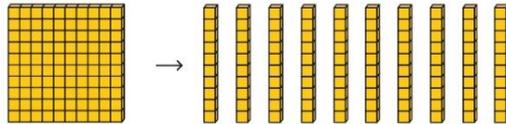
Column subtraction with exchange across more than one column

Understand why two exchanges may be necessary.

$$2,502 - 243 = ?$$



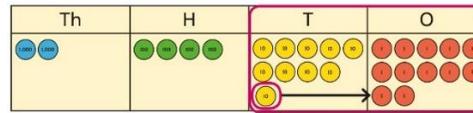
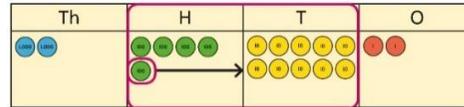
I need to exchange a 10 for some 1s, but there are not any 10s here.



Column subtraction with exchange across more than one column

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

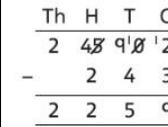
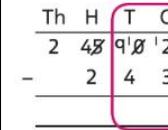
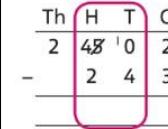
$$2,502 - 243 = ?$$



Column subtraction with exchange across more than one column

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

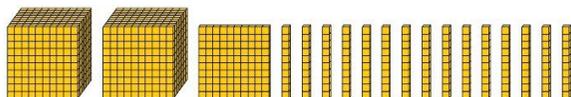
$$2,502 - 243 = ?$$



Year 5 - Subtraction

Column subtraction with whole numbers Use place value equipment to understand where exchanges are required.

$$2,250 - 1,070$$



Column subtraction with whole numbers 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
●	●●●●●	●●●●●	●●●●●	●●●●●
				●●●●●
				●●●●●
				●●●●●
				●●●●●

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

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

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

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

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

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

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

Column subtraction with whole numbers Use column subtraction methods with exchange where required.

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

$$62,097 - 18,534 = 43,563$$

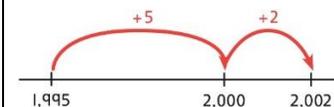
Choosing efficient methods

Choosing efficient methods

Choosing efficient methods

To subtract two large numbers that are close, children find the difference by counting on.

$$2,002 - 1,995 = ?$$



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

Subtracting decimals

Explore complements to a whole number by working in the context of length.



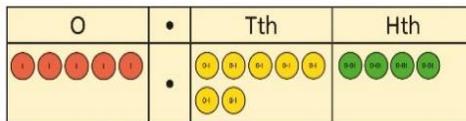
$$1 \text{ m} - \square \text{ m} = \square \text{ m}$$

$$1 - 0.49 = ?$$

Subtracting decimals

Use a place value grid to represent the stages of column subtraction, including exchanges where required.

$$5.74 - 2.25 = ?$$



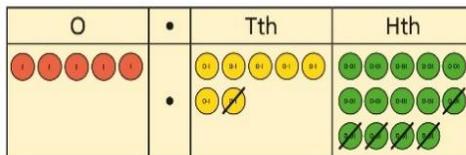
$$\begin{array}{r} \text{O} \cdot \text{Tth} \text{Hth} \\ 5 \cdot 7 \ 4 \\ - 2 \cdot 2 \ 5 \\ \hline \end{array}$$

Exchange 1 tenth for 10 hundredths.



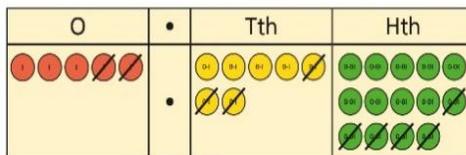
$$\begin{array}{r} \text{O} \cdot \text{Tth} \text{Hth} \\ 5 \cdot \overset{6}{7} \overset{1}{4} \\ - 2 \cdot 2 \ 5 \\ \hline \end{array}$$

Now subtract the 5 hundredths.



$$\begin{array}{r} \text{O} \cdot \text{Tth} \text{Hth} \\ 5 \cdot \overset{6}{7} \overset{1}{4} \\ - 2 \cdot 2 \ 5 \\ \hline \cdot \ 9 \end{array}$$

Now subtract the 2 tenths, then the 2 ones.



$$\begin{array}{r} \text{O} \cdot \text{Tth} \text{Hth} \\ 5 \cdot \overset{6}{7} \overset{1}{4} \\ - 2 \cdot 2 \ 5 \\ \hline 3 \cdot 4 \ 9 \end{array}$$

Subtracting decimals

Use column subtraction, with an understanding of place value, including subtracting numbers with different numbers of decimal places.

$$3.921 - 3.75 = ?$$

$$\begin{array}{r} \text{O} \cdot \text{Tth} \text{Hth} \text{Thth} \\ 3 \cdot 9 \ 2 \ 1 \\ - 3 \cdot 7 \ 5 \ 0 \\ \hline \end{array}$$

Year 6 - Subtraction

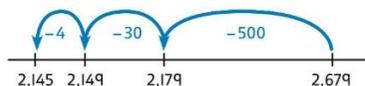
Comparing and selecting efficient methods (including mental methods with larger numbers)

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

Th	H	T	O
●●	●●●●●●●●	●●●●●●	●●●●●●●●

Comparing and selecting efficient methods (including mental methods with larger numbers)

Compare subtraction methods alongside place value representations.

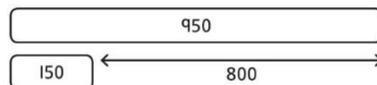


Th	H	T	O
●●	●●●●●●●●	●●●●●●	●●●●●●●●

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

Use a bar model to show how unitising can support mental calculations.

950,000 – 150,000
That is 950 thousands – 150 thousands

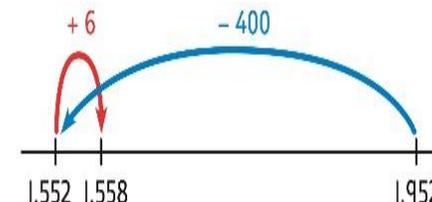


So, the difference is 800 thousands.
950,000 – 150,000 = 800,000

Comparing and selecting efficient methods (including mental methods with larger numbers)

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
1	8	14	12
-	1	5	5
3	9	4	



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

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

Year 1 - Multiplication

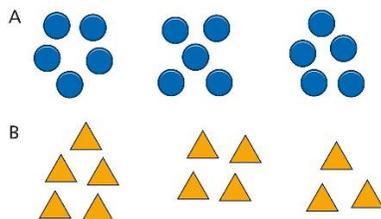
Recognising and making equal groups

Children arrange objects in equal and unequal groups and understand how to recognise whether they are equal.



Recognising and making equal groups

Children draw and represent equal and unequal groups.



Describe equal groups using words

Three equal groups of 4.
Four equal groups of 3.

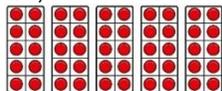
Finding the total of equal groups by counting in 2s, 5s and 10s



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

Finding the total of equal groups by counting in 2s, 5s and 10s

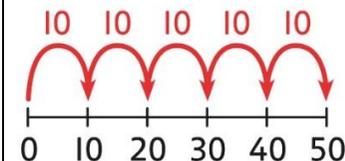
100 squares and ten frames support counting in 2s, 5s and 10s.



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

Finding the total of equal groups by counting in 2s, 5s and 10s

Use a number line to support repeated addition through counting in 2s, 5s and 10s.



Year 2 - Multiplication

Equal groups and repeated addition Recognise equal groups and write as repeated addition and as multiplication.



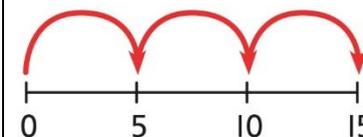
3 groups of 5 chairs
15 chairs altogether

Equal groups and repeated addition Recognise equal groups using standard objects such as counters and write as repeated addition and multiplication.



3 groups of 5
15 in total

Equal groups and repeated addition Use a number line and write as repeated addition and as multiplication.



$5 + 5 + 5 = 15$
 $3 \times 5 = 15$

Using arrays to represent multiplication and support understanding

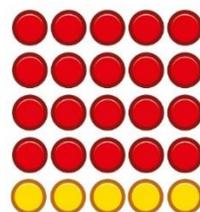
Understand the relationship between arrays, multiplication and repeated addition.



4 groups of 5

Using arrays to represent multiplication and support understanding

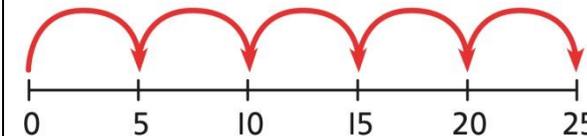
Understand the relationship between arrays, multiplication and repeated addition.



4 groups of 5 ... 5 groups of 5

Using arrays to represent multiplication and support understanding

Understand the relationship between arrays, multiplication and repeated addition.



$5 \times 5 = 25$

Understanding commutativity

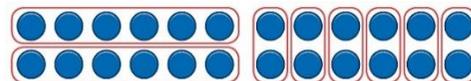
Use arrays to visualise commutativity.



I can see 6 groups of 3.
I can see 3 groups of 6.

Understanding commutativity

Form arrays using counters to visualise commutativity. Rotate the array to show that orientation does not change the multiplication.



This is 2 groups of 6 and also 6 groups of 2.

Understanding commutativity

Use arrays to visualise commutativity.



$4 + 4 + 4 + 4 + 4 = 20$
 $5 + 5 + 5 + 5 = 20$
 $4 \times 5 = 20$ and $5 \times 4 = 20$

Learning x2, x5 and x10 table facts

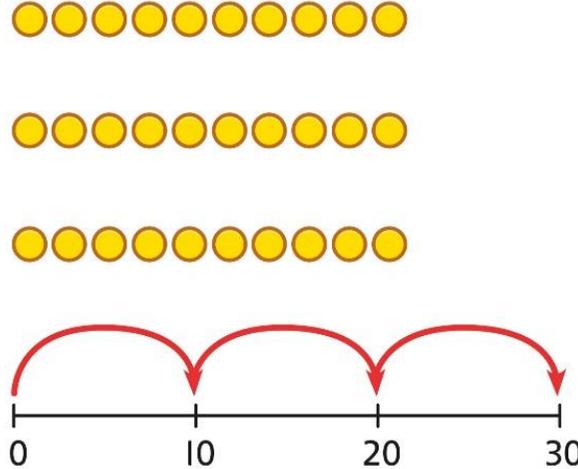
Develop an understanding of how to unitise groups of 2, 5 and 10 and learn corresponding times-table facts.



3 groups of 10 ... 10, 20, 30
 $3 \times 10 = 30$

Learning x2, x5 and x10 table facts

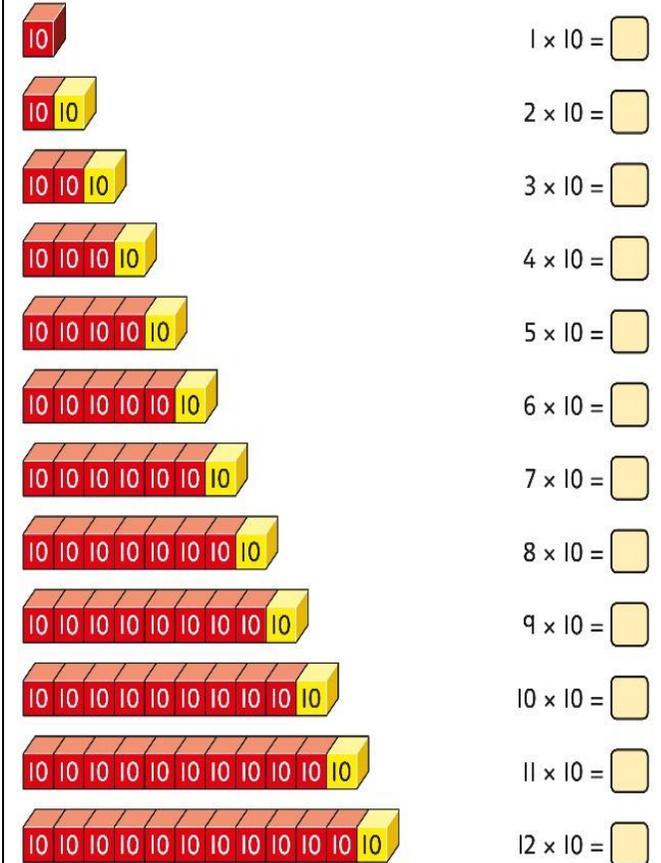
Understand how to relate counting in unitised groups and repeated addition with knowing key times-table facts.



$10 + 10 + 10 = 30$
 $3 \times 10 = 30$
 '3 lots/groups of 10 is 30'

Learning x2, x5 and x10 table facts

Understand how the times-tables increase and contain patterns.



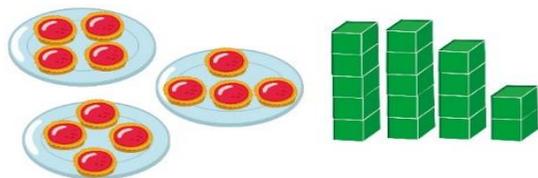
$5 \times 10 = 50$
 $6 \times 10 = 60$

Year 3 - Multiplication

Understanding equal grouping and repeated addition (counting in steps)

Children continue to build understanding of equal groups and the relationship with repeated addition.

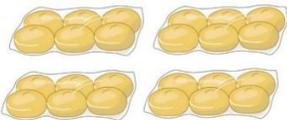
They recognise both examples and non-examples using objects.



Children recognise that arrays can be used to model commutative multiplications.



I can see 6 groups of 4 pens



I can see 4 groups of 6 eggs

Understanding and using x3, x2, x4 and x8 tables.

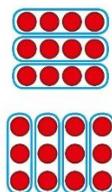
Children learn the times-tables as 'groups of', but apply their knowledge of commutativity.



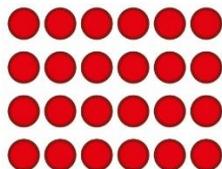
I can use the x3 table to work out how many keys. I can also use the x3 table to work out how many batteries.

Understanding equal grouping and repeated addition (counting in steps)

Children recognise that arrays demonstrate commutativity.



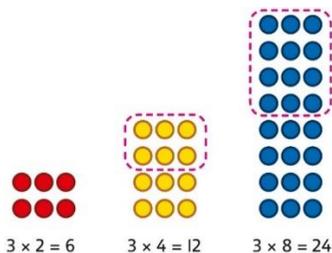
*This is 3 groups of 4.
This is 4 groups of 3*



$6 \times 4 = 24$
 $4 \times 6 = 24$

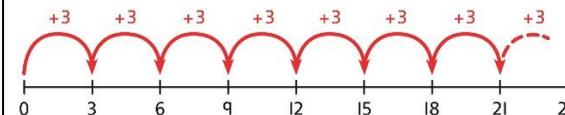
Understanding and using x3, x2, x4 and x8 tables.

Children understand how the x2, x4 and x8 tables are related through repeated doubling.



Understanding equal grouping and repeated addition (counting in steps)

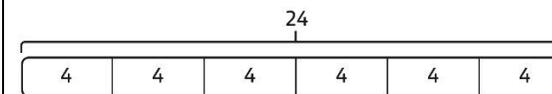
Children understand the link between repeated addition and multiplication.



8 groups of 3 is 24.

$3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 = 24$
 $8 \times 3 = 24$

A bar model may represent multiplications as equal groups.

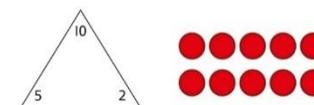


$6 \times 4 = 24$

Understanding and using x3, x2, x4 and x8 tables.

Children understand the relationship between related multiplication and division facts in known times-tables.

$2 \times 5 = 10$
 $5 \times 2 = 10$
 $10 \div 5 = 2$
 $10 \div 2 = 5$



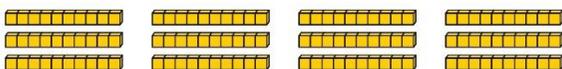
Using known facts to multiply 10s, for example 3×40

Explore the relationship between known times-tables and multiples of 10 using place value equipment.

Make 4 groups of 3 ones.



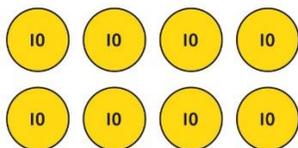
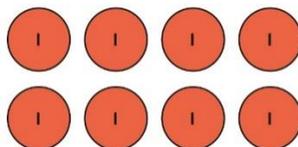
Make 4 groups of 3 tens.



What is the same?
What is different?

Using known facts to multiply 10s, for example 3×40

Understand how unitising 10s supports multiplying by multiples of 10.



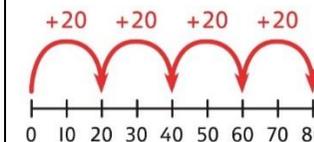
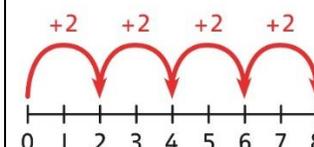
4 groups of 2 ones is 8 ones.
4 groups of 2 tens is 8 tens.

$$4 \times 2 = 8$$

$$4 \times 20 = 80$$

Using known facts to multiply 10s, for example 3×40

Understand how to use known times-tables to multiply multiples of 10.



$$4 \times 2 = 8$$

$$4 \times 20 = 80$$

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.

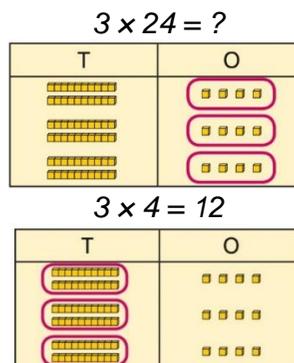
Each person has 2 tens and 3 ones.



There are 3 groups of 2 tens.
There are 3 groups of 3 ones.

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

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



$$3 \times 20 = 60$$

$$60 + 12 = 72$$

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

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

$$4 \times 13 = ?$$

$$4 \times 3 = 12 \qquad 4 \times 10 = 40$$

$$12 + 40 = 52$$

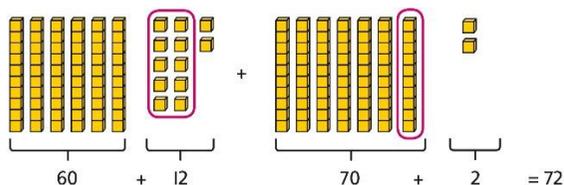
$$4 \times 13 = 52$$

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.

$3 \times 24 = ?$

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

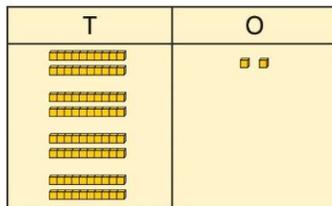
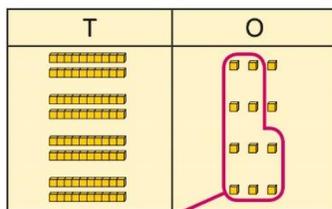


$3 \times 24 = 60 + 12$
 $3 \times 24 = 70 + 2$
 $3 \times 24 = 72$

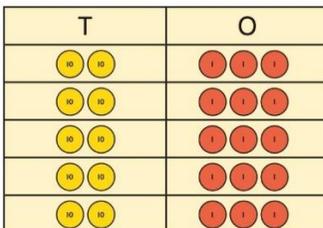
Multiplying a 2-digit number by a 1-digit number, expanded column method

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

$4 \times 23 = ?$



$4 \times 23 = 92$



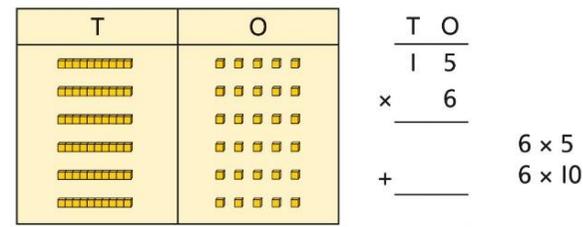
$5 \times 23 = ?$

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

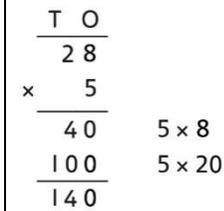
Multiplying a 2-digit number by a 1-digit number, expanded column method

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.



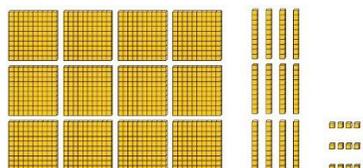
$5 \times 28 = ?$



Year 4 - Multiplication

Multiplying by multiples of 10 and 100

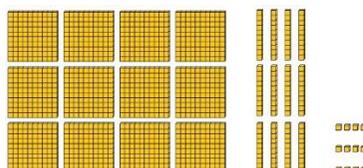
Use unitising and place value equipment to understand how to multiply by multiples of 1, 10 and 100.



3 groups of 4 ones is 12 ones.
3 groups of 4 tens is 12 tens.
3 groups of 4 hundreds is 12 hundreds.

Multiplying by multiples of 10 and 100

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



$3 \times 4 = 12$
 $3 \times 40 = 120$
 $3 \times 400 = 1,200$

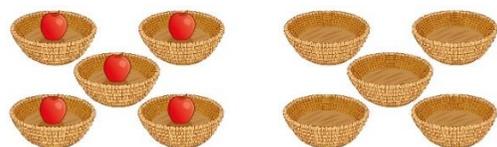
Multiplying by multiples of 10 and 100

Use known facts and understanding of place value and commutativity to multiply mentally.

$4 \times 7 = 28$
 $4 \times 70 = 280$
 $40 \times 7 = 280$
 $4 \times 700 = 2,800$
 $400 \times 7 = 2,800$

Understanding times-tables up to 12×12

Understand the special cases of multiplying by 1 and 0.

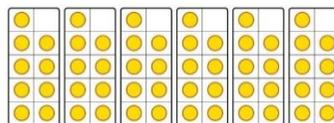


$5 \times 1 = 5$

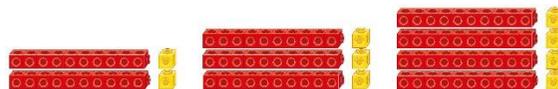
$5 \times 0 = 0$

Understanding times-tables up to 12×12

Represent the relationship between the $\times 9$ table and the $\times 10$ table.



Represent the $\times 11$ table and $\times 12$ tables in relation to the $\times 10$ table.



$2 \times 11 = 20 + 2$
 $3 \times 11 = 30 + 3$
 $4 \times 11 = 40 + 4$



$4 \times 12 = 40 + 8$

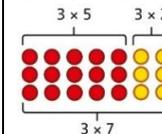
Understanding times-tables up to 12×12

Understand how times-tables relate to counting patterns.

Understand links between the $\times 3$ table, $\times 6$ table and $\times 9$ table
 5×6 is double 5×3

$\times 5$ table and $\times 6$ table
*I know that $7 \times 5 = 35$
so I know that $7 \times 6 = 35 + 7$.*

$\times 5$ table and $\times 7$ table
 $3 \times 7 = 3 \times 5 + 3 \times 2$

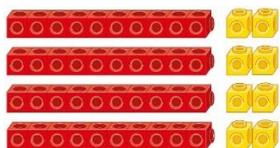


$\times 9$ table and $\times 10$ table
 $6 \times 10 = 60$
 $6 \times 9 = 60 - 6$

Understanding and using partitioning in multiplication

Make multiplications by partitioning.

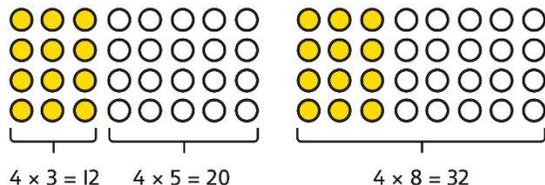
4×12 is 4 groups of 10 and 4 groups of 2.



$4 \times 12 = 40 + 8$

Understanding and using partitioning in multiplication

Understand how multiplication and partitioning are related through addition.

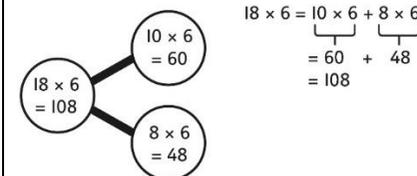


$4 \times 3 = 12$
 $4 \times 5 = 20$
 $12 + 20 = 32$
 $4 \times 8 = 32$

Understanding and using partitioning in multiplication

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

$18 \times 6 = ?$

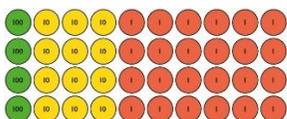


$18 \times 6 = 10 \times 6 + 8 \times 6$
 $= 60 + 48$
 $= 108$

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.



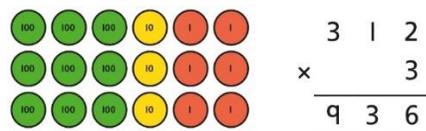
I can work out how many 1s, 10s and 100s.

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

$24 + 120 + 400 = 544$

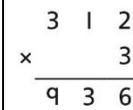
Column multiplication for 2- and 3-digit numbers multiplied by a single digit

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

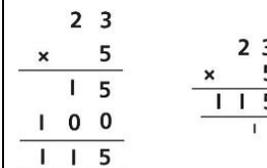


Column multiplication for 2- and 3-digit numbers multiplied by a single digit

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



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.



Multiplying more than two numbers Represent situations by multiplying three numbers together.



Each sheet has 2×5 stickers.
There are 3 sheets.

There are $5 \times 2 \times 3$ stickers in total.

$$5 \times 2 \times 3 = 30$$

$$\underbrace{\hspace{1.5cm}}_{10} \times 3 = 30$$

Multiplying more than two numbers Understand that commutativity can be used to multiply in different orders.



$$2 \times 6 \times 10 = 120$$

$$12 \times 10 = 120$$

$$10 \times 6 \times 2 = 120$$

$$60 \times 2 = 120$$

Multiplying more than two numbers Use knowledge of factors to simplify some multiplications.

$$24 \times 5 = 12 \times 2 \times 5$$

$$12 \times 2 \times 5 =$$

$$\underbrace{\hspace{1.5cm}}_{12} \times 5 = 120$$

So, $24 \times 5 = 120$

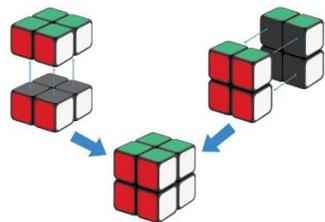
Year 5 - Multiplication

Understanding factors

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

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

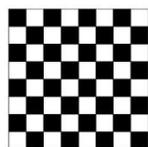
Use cubes to explore cube numbers.



8 is a cube number.

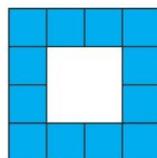
Understanding factors

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



$$8 \times 8 = 64$$

$$8^2 = 64$$



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

Understanding factors

Understand the pattern of square numbers in the multiplication tables.

Use a multiplication grid to circle each square number. Can children spot a pattern?

Multiplying by 10, 100 and 1,000

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

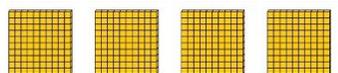
$$4 \times 1 = 4 \text{ ones} = 4$$



$$4 \times 10 = 4 \text{ tens} = 40$$

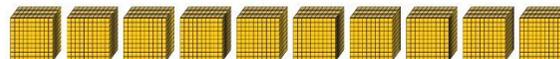
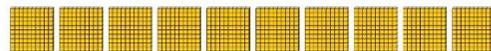


$$4 \times 100 = 4 \text{ hundreds} = 400$$



Multiplying by 10, 100 and 1,000

Understand the effect of repeated multiplication by 10.



Multiplying by 10, 100 and 1,000

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

H	T	O
	1	7

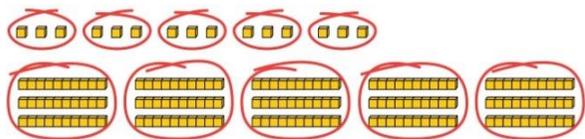
$$17 \times 10 = 170$$

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

$$17 \times 1,000 = 17 \times 10 \times 10 \times 10 = 17,000$$

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.

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

Multiplying by multiples of 10, 100 and 1,000

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



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

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

Multiplying by multiples of 10, 100 and 1,000

Use known facts and unitising to multiply.

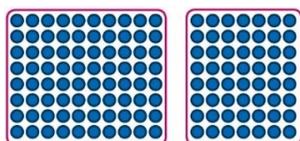
$5 \times 4 = 20$
 $5 \times 40 = 200$
 $5 \times 400 = 2,000$
 $5 \times 4,000 = 20,000$

$5,000 \times 4 = 20,000$

Multiplying up to 4-digit numbers by a single digit

Explore how to use partitioning to multiply efficiently.

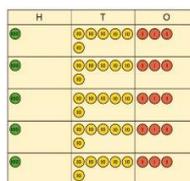
$8 \times 17 = ?$



$8 \times 10 = 80$
 $8 \times 7 = 56$
 $80 + 56 = 136$

Multiplying up to 4-digit numbers by a single digit

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



Multiplying up to 4-digit numbers by a single digit

Use a column multiplication, including any required exchanges.

$$\begin{array}{r} 136 \\ \times 6 \\ \hline 816 \\ \hline 23 \end{array}$$

Multiplying 2-digit numbers by 2-digit numbers

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

$23 \times 15 = ?$



$10 \times 15 = 150$

$10 \times 15 = 150$



$3 \times 15 = 45$

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

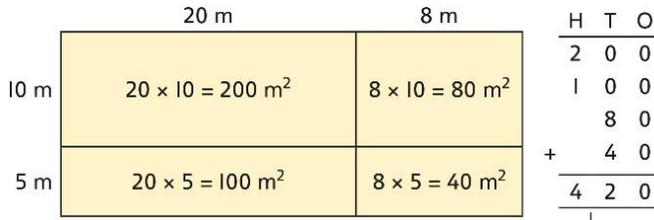
There are 345 bottles of milk in total.

$23 \times 15 = 345$

Multiplying 2-digit numbers by 2-digit numbers

Use an area model and add the parts.

$28 \times 15 = ?$



$28 \times 15 = 420$

Multiplying 2-digit numbers by 2-digit numbers

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

$$\begin{array}{r} 34 \\ \times 27 \\ \hline 238 \\ 680 \\ \hline 918 \end{array}$$

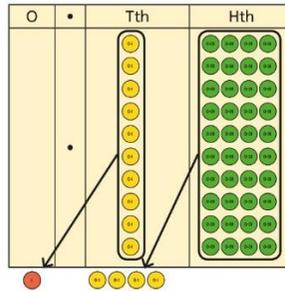
34×7
 34×20
 34×27

Multiplying decimals by 10, 100 and 1,000

Use place value equipment to explore and understand the exchange of 10 tenths, 10 hundredths or 10 thousandths.

Multiplying decimals by 10, 100 and 1,000

Represent multiplication by 10 as exchange on a place value grid.



$0.14 \times 10 = 1.4$

Multiplying decimals by 10, 100 and 1,000

Understand how this exchange is represented on a place value chart.

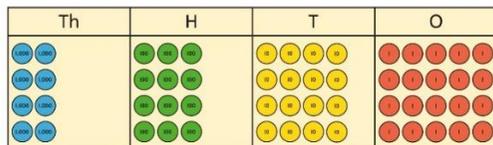
$2.5 \times 10 = 25$
 $2.5 \times 100 = 250$
 $2.5 \times 1,000 = 2,500$

Th	H	T	O	.	Tth
			2	.	5
		2	5	.	
	2	5	0	.	
2	5	0	0	.	

Year 6 - Multiplication

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

Use equipment to explore multiplications.



4 groups of 2,345

This is a multiplication:

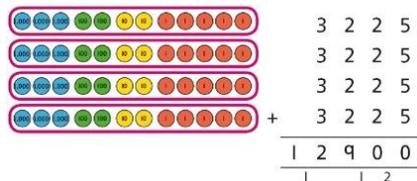
$$4 \times 2,345$$

$$2,345 \times 4$$

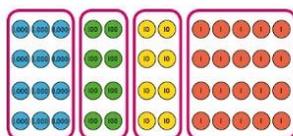
Multiplying up to a 4-digit number by a single digit number

Use place value equipment to compare methods.

Method 1



Method 2



$$4 \times 3,000 \quad 4 \times 200 \quad 4 \times 20 \quad 4 \times 5$$

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

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

Understand area model and short multiplication.

Compare and select appropriate methods (including column methods) for specific multiplications.

$$\begin{array}{r} 3225 \\ \times \quad 4 \\ \hline 12900 \\ \\ \\ \hline \end{array}$$

Use a grid model alongside written multiplication.

Method 1

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

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

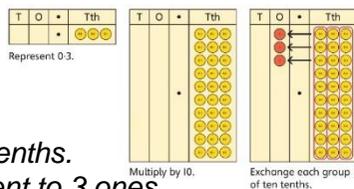
Use compact column multiplication with understanding of place value at all stages.

$$\begin{array}{r} 1235 \\ \times \quad 21 \\ \hline 1235 \\ 24700 \\ \hline 25935 \end{array}$$

$1 \times 1,235$
 $20 \times 1,235$
 $21 \times 1,235$

Multiplying by 10, 100 and 1,000

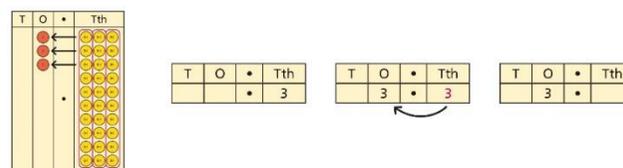
Use place value equipment to explore exchange in decimal multiplication.



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

Multiplying by 10, 100 and 1,000

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



$$0.3 \times 10 = 3$$

Multiplying by 10, 100 and 1,000

Use knowledge of multiplying by 10, 100 and 1,000

$$8 \times 100 = 800$$

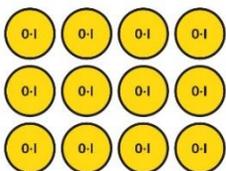
$$8 \times 300 = 800 \times 3 = 2,400$$

$$2.5 \times 10 = 25$$

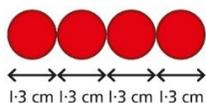
$$2.5 \times 20 = 2.5 \times 10 \times 2 = 50$$

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.



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

Multiplying decimals

Represent calculations on a place value grid.

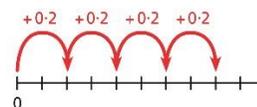
$$3 \times 3 = 9$$

$$3 \times 0.3 = 0.9$$

T	O	•	Tth

Understand the link between multiplying decimals and repeated addition.

T	O	•	Tth



Multiplying decimals

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 1 - Division

Grouping

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

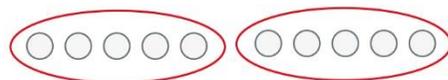
Sort a whole set people and objects into equal groups.



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

Grouping

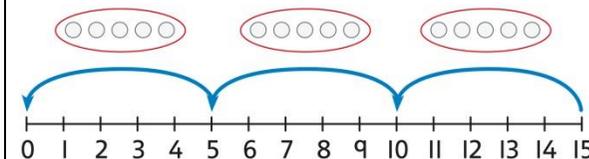
Represent a whole and work out how many equal groups.



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

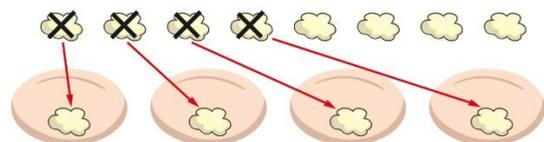
Grouping

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



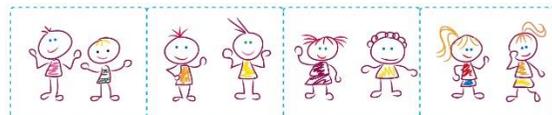
Sharing

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



Sharing

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



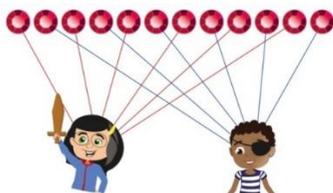
Sharing

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

Year 2 - Division

Sharing equally

Start with a whole and share into equal parts, one at a time.

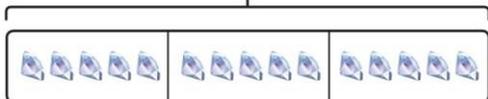


*12 shared equally between 2.
They get 6 each.*

Start to understand how this also relates to grouping. To share equally between 3 people, take a group of 3 and give 1 to each person. Keep going until all the objects have been shared



15



They get 5  each.

*15 shared equally between 3.
They get 5 each.*

Sharing equally

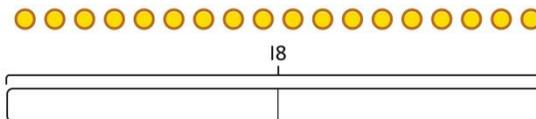
Represent the objects shared into equal parts using a bar model.



*20 shared into 5 equal parts.
There are 4 in each part.*

Sharing equally

Use a bar model to support understanding of the division.



$$18 \div 2 = 9$$

Grouping equally

Understand how to make equal groups from a whole.



*8 divided into 4 equal groups.
There are 2 in each group.*

Grouping equally

Understand the relationship between grouping and the division statements.

$12 \div 3 = 4$

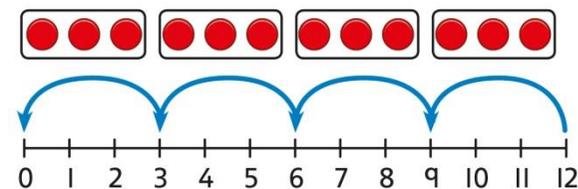
$12 \div 4 = 3$

$12 \div 6 = 2$

$12 \div 2 = 6$

Grouping equally

Understand how to relate division by grouping to repeated subtraction.



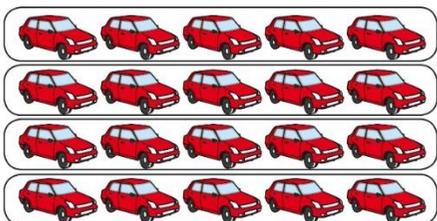
There are 4 groups now.

*12 divided into groups of 3.
 $12 \div 3 = 4$*

There are 4 groups.

Using known times-tables to solve divisions

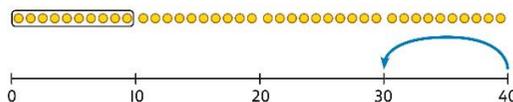
Understand the relationship between multiplication facts and division.



*4 groups of 5 cars is 20 cars in total.
20 divided by 4 is 5.*

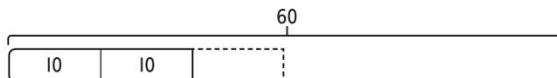
Using known times-tables to solve divisions

Link equal grouping with repeated subtraction and known times-table facts to support division.



40 divided by 4 is 10.

Use a bar model to support understanding of the link between times-table knowledge and division.



Using known times-tables to solve divisions

Relate times-table knowledge directly to division.

- $1 \times 10 = 10$
- $2 \times 10 = 20$
- $3 \times 10 = 30$**
- $4 \times 10 = 40$
- $5 \times 10 = 50$
- $6 \times 10 = 60$
- $7 \times 10 = 70$
- $8 \times 10 = 80$

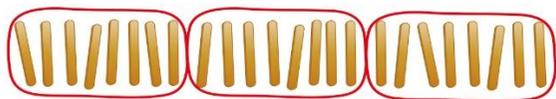


I know that 3 groups of 10 makes 30, so I know that 30 divided by 10 is 3.

$3 \times 10 = 30$ so $30 \div 10 = 3$

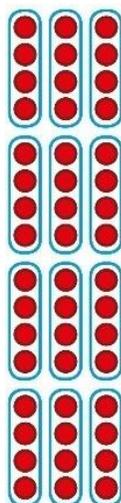
Year 3 - Division

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.

Using times-tables knowledge to divide Use knowledge of known times-tables to calculate divisions.



$$48 \div 4 = 12$$

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

$$4 \times 12 = 48$$

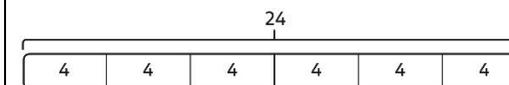
$$48 \div 4 = 12$$

Using times-tables knowledge to divide 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 $30 \div 5 = 6$.*

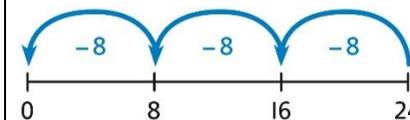
A bar model may represent the relationship between sharing and grouping.



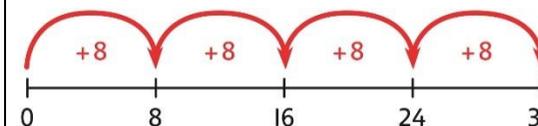
$$24 \div 4 = 6$$

$$24 \div 6 = 4$$

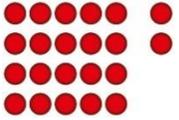
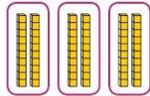
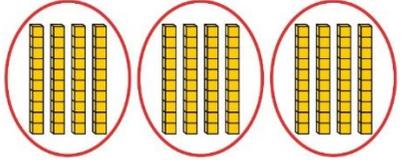
Children understand how division is related to both repeated subtraction and repeated addition.



$$24 \div 8 = 3$$

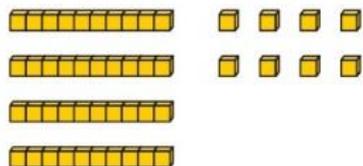


$$32 \div 8 = 4$$

<p>Understanding remainders 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>Understanding remainders Use images to explain remainders.</p>  <p>$22 \div 5 = 4 \text{ remainder } 2$</p>	<p>Understanding remainders Understand that the remainder is what cannot be shared equally from a set.</p> <p>$22 \div 5 = ?$</p> <p>$3 \times 5 = 15$ $4 \times 5 = 20$ So, $22 \div 5 = 4 \text{ remainder } 2$</p>
<p>Using known facts to divide multiples of 10 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>Using known facts to divide multiples of 10 Divide multiples of 10 by unitising.</p>  <p><i>12 tens shared into 3 equal groups. 4 tens in each group.</i></p>	<p>Using known facts to divide multiples of 10 Divide multiples of 10 by a single digit using known times-tables.</p> <p>$180 \div 3 = ?$</p> <p><i>180 is 18 tens.</i></p> <p><i>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>

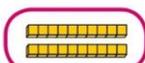
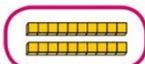
2-digit number divided by 1-digit number, no remainders

Children explore dividing 2-digit numbers by using place value equipment.



$48 \div 2 = ?$

First divide the 10s.

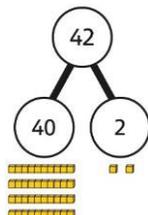


Then divide the 1s.

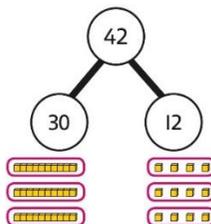


2-digit number divided by 1-digit number, no remainders

Children explore which partitions support particular divisions.



I need to partition 42 differently to divide by 3.

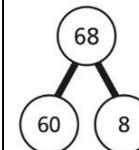


$42 = 30 + 12$

$42 \div 3 = 14$

2-digit number divided by 1-digit number, no remainders

Children partition a number into 10s and 1s to divide where appropriate.



$60 \div 2 = 30$

$8 \div 2 = 4$

$30 + 4 = 34$

$68 \div 2 = 34$

Children partition flexibly to divide where appropriate.

I need to partition 42 differently to divide by 3.

$42 = 30 + 12$

$30 \div 3 = 10$

$12 \div 3 = 4$

$10 + 4 = 14$

$42 \div 3 = 14$

2-digit number divided by 1-digit number, with remainders

Use place value equipment to understand the concept of remainder.

Make 29 from place value equipment. Share it into 2 equal groups.



There are two groups of 14 and 1 remainder.

2-digit number divided by 1-digit number, with remainders

Use place value equipment to understand the concept of remainder in division.

$29 \div 2 = ?$



$29 \div 2 = 14 \text{ remainder } 1$

2-digit number divided by 1-digit number, with remainders

Partition to divide, understanding the remainder in context.

67 children try to make 5 equal lines.

$67 = 50 + 17$

$50 \div 5 = 10$

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

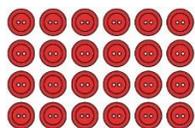
$67 \div 5 = 13 \text{ remainder } 2$

There are 13 children in each line and 2 children left out.

Year 4 - Division

Understanding the relationship between multiplication and division, including times-tables

Use objects to explore families of multiplication and division facts.

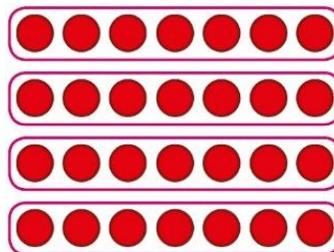


$4 \times 6 = 24$
 24 is 6 groups of 4.
 24 is 4 groups of 6.

24 divided by 6 is 4.
 24 divided by 4 is 6.

Understanding the relationship between multiplication and division, including times-tables

Represent divisions using an array.



$28 \div 7 = 4$

Understanding the relationship between multiplication and division, including times-tables

Understand families of related multiplication and division facts.

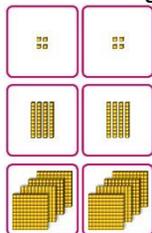
I know that $5 \times 7 = 35$

so I know all these facts:

- $5 \times 7 = 35$
- $7 \times 5 = 35$
- $35 = 5 \times 7$
- $35 = 7 \times 5$
- $35 \div 5 = 7$
- $35 \div 7 = 5$
- $7 = 35 \div 5$
- $5 = 35 \div 7$

Dividing multiples of 10 and 100 by a single digit

Use place value equipment to understand how to use unitising to divide.



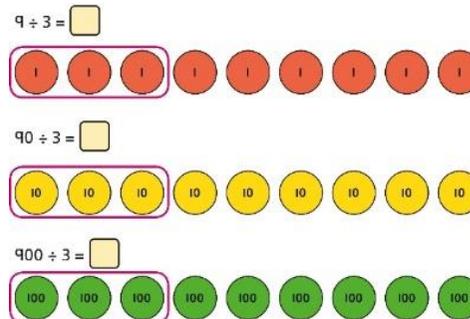
8 ones divided into 2 equal groups
 4 ones in each group

8 tens divided into 2 equal groups
 4 tens in each group

8 hundreds divided into 2 equal groups
 4 hundreds in each group

Dividing multiples of 10 and 100 by a single digit

Represent divisions using place value equipment.



$9 \div 3 = \square$

$90 \div 3 = \square$

$900 \div 3 = \square$

$9 \div 3 = 3$

9 tens divided by 3 is 3 tens.
 9 hundreds divided by 3 is 3 hundreds.

Dividing multiples of 10 and 100 by a single digit

Use known facts to divide 10s and 100s by a single digit.

$15 \div 3 = 5$

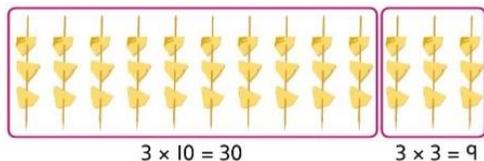
$150 \div 3 = 50$

$1500 \div 3 = 500$

Dividing 2-digit and 3-digit numbers by a single digit by partitioning into 100s, 10s and 1s

Partition into 10s and 1s to divide where appropriate.

$39 \div 3 = ?$



$39 = 30 + 9$

$30 \div 3 = 10$

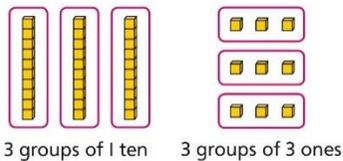
$9 \div 3 = 3$

$39 \div 3 = 13$

Dividing 2-digit and 3-digit numbers by a single digit by partitioning into 100s, 10s and 1s

Partition into 100s, 10s and 1s using Base 10 equipment to divide where appropriate.

$39 \div 3 = ?$



$39 = 30 + 9$

$30 \div 3 = 10$

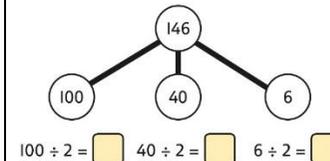
$9 \div 3 = 3$

$39 \div 3 = 13$

Dividing 2-digit and 3-digit numbers by a single digit by partitioning into 100s, 10s and 1s

Partition into 100s, 10s and 1s using a part-whole model to divide where appropriate.

$142 \div 2 = ?$



$100 \div 2 = 50$

$40 \div 2 = 20$

$6 \div 2 = 3$

$50 + 20 + 3 = 73$

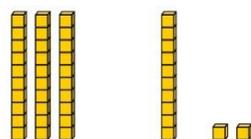
$142 \div 2 = 73$

Dividing 2-digit and 3-digit numbers by a single digit, using flexible partitioning

Use place value equipment to explore why different partitions are needed.

$42 \div 3 = ?$

I will split it into 30 and 12, so that I can divide by 3 more easily.

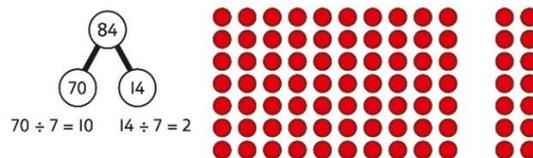


Dividing 2-digit and 3-digit numbers by a single digit, using flexible partitioning

Represent how to partition flexibly where needed.

$84 \div 7 = ?$

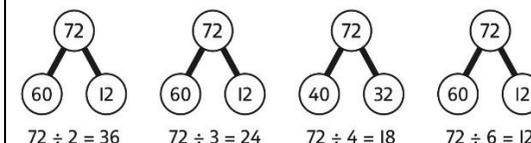
I will partition into 70 and 14 because I am dividing by 7.



$84 \div 7 = 12$

Dividing 2-digit and 3-digit numbers by a single digit, using flexible partitioning

Make decisions about appropriate partitioning based on the division required.



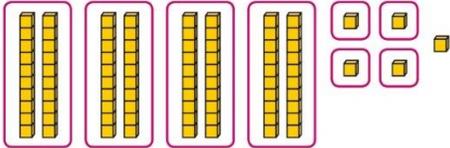
Understand that different partitions can be used to complete the same division.

Understanding remainders

Use place value equipment to find remainders.

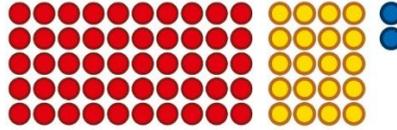
85 shared into 4 equal groups

There are 24, and 1 that cannot be shared.



Dividing 2-digit and 3-digit numbers by a single digit, using flexible partitioning

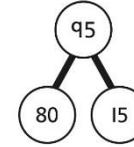
Represent the remainder as the part that cannot be shared equally.



$$72 \div 5 = 14 \text{ remainder } 2$$

Dividing 2-digit and 3-digit numbers by a single digit, using flexible partitioning

Understand how partitioning can reveal remainders of divisions.



$$80 \div 4 = 20$$

$$12 \div 4 = 3$$

$$95 \div 4 = 23 \text{ remainder } 3$$

Year 5 - Division

Understanding factors and prime numbers

Use equipment to explore the factors of a given number.

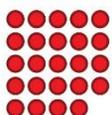


$$24 \div 3 = 8$$

$$24 \div 8 = 3$$

8 and 3 are factors of 24 because they divide 24 exactly.

24 ÷ 5 = 4 remainder 4.



5 is not a factor of 24 because there is a remainder.

Understanding factors and prime numbers

Understand that prime numbers are numbers with exactly two factors.

$$13 \div 1 = 13$$

$$13 \div 2 = 6 r 1$$

$$13 \div 4 = 4 r 1$$

1 and 13 are the only factors of 13.
13 is a prime number.

Understanding factors and prime numbers

Understand how to recognise prime and composite numbers.

I know that 31 is a prime number because it can be divided by only 1 and itself without leaving a remainder.

I know that 33 is not a prime number as it can be divided by 1, 3, 11 and 33.

I know that 1 is not a prime number, as it has only 1 factor.

Understanding inverse operations and the link with multiplication, grouping and sharing

Use equipment to group and share and to explore the calculations that are present.

I have 28 counters.

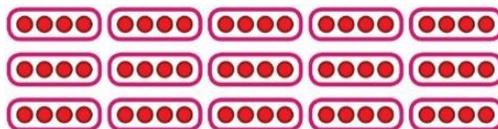
I made 7 groups of 4. There are 28 in total.

I have 28 in total. I shared them equally into 7 groups. There are 4 in each group.

I have 28 in total. I made groups of 4. There are 7 equal groups.

Understanding inverse operations and the link with multiplication, grouping and sharing

Represent multiplicative relationships and explore the families of division facts.



$$60 \div 4 = 15$$

$$60 \div 15 = 4$$

Understanding inverse operations and the link with multiplication, grouping and sharing

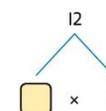
Represent the different multiplicative relationships to solve problems requiring inverse operations.

$$12 \div 3 = \square$$

$$12 \div \square = 3$$

$$\square \times 3 = 12$$

$$\square \div 3 = 12$$



Understand missing number problems for division calculations and know how to solve them using inverse operations.

$$22 \div ? = 2$$

$$22 \div 2 = ?$$

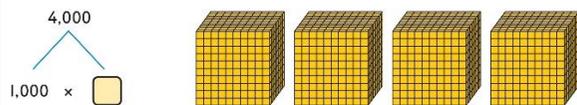
$$? \div 2 = 22$$

$$? \div 22 = 2$$

Dividing whole numbers by 10, 100 and 1,000

Use place value equipment to support unitising for division.

$$4,000 \div 1,000$$



4,000 is 4 thousands.

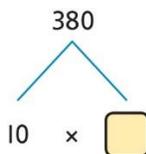
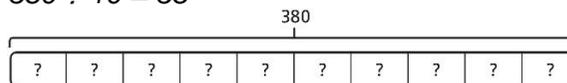
$$4 \times 1,000 = 4,000$$

So, $4,000 \div 1,000 = 4$

Dividing whole numbers by 10, 100 and 1,000

Use a bar model to support dividing by unitising.

$$380 \div 10 = 38$$



380 is 38 tens.

$$38 \times 10 = 380$$

$$10 \times 38 = 380$$

So, $380 \div 10 = 38$

Dividing whole numbers by 10, 100 and 1,000

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

Th	H	T	O
3	2	0	0

$$3,200 \div 100 = ?$$

3,200 is 3 thousands and 2 hundreds.

$$200 \div 100 = 2$$

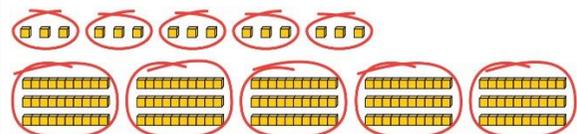
$$3,000 \div 100 = 30$$

$$3,200 \div 100 = 32$$

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

Dividing by multiples of 10, 100 and 1,000

Use place value equipment to represent known facts and unitising.



15 ones put into groups of 3 ones. There are 5 groups.

$$15 \div 3 = 5$$

15 tens put into groups of 3 tens. There are 5 groups.

$$150 \div 30 = 5$$

Dividing by multiples of 10, 100 and 1,000

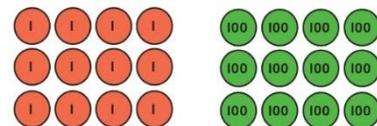
Represent related facts with place value equipment when dividing by unitising.



180 is 18 tens.

18 tens divided into groups of 3 tens. There are 6 groups.

$$180 \div 30 = 6$$



12 ones divided into groups of 4. There are 3 groups.

12 hundreds divided into groups of 4 hundreds.

There are 3 groups.

$$1200 \div 400 = 3$$

Dividing by multiples of 10, 100 and 1,000

Reason from known facts, based on understanding of unitising. Use knowledge of the inverse relationship to check.

$$3,000 \div 5 = 600$$

$$3,000 \div 50 = 60$$

$$3,000 \div 500 = 6$$

$$5 \times 600 = 3,000$$

$$50 \times 60 = 3,000$$

$$500 \times 6 = 3,000$$

Dividing up to four digits by a single digit using short division

Explore grouping using place value equipment.

$$268 \div 2 = ?$$

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

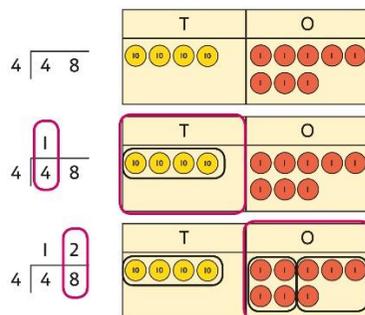
$$264 \div 2 = 134$$

Dividing up to four digits by a single digit using short division

Use place value equipment on a place value grid alongside short division.

The model uses grouping.

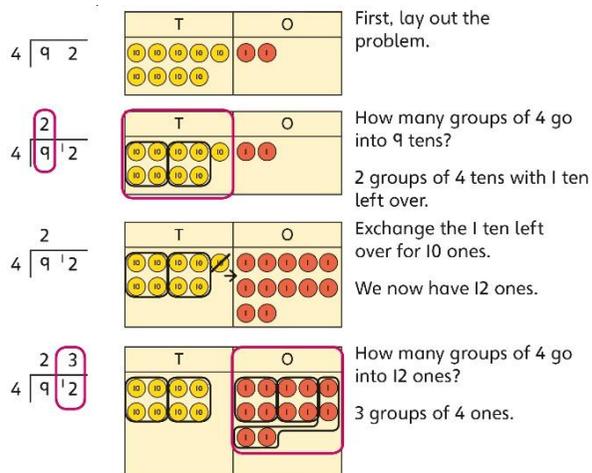
A sharing model can also be used, although the model would need adapting.



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.



Dividing up to four digits by a single digit using short division

Use short division for up to 4-digit numbers divided by a single digit.

$$\begin{array}{r} 0556 \\ 7 \overline{) 3892} \end{array}$$

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

Use multiplication to check.

$$556 \times 7 = ?$$

$$6 \times 7 = 42$$

$$50 \times 7 = 350$$

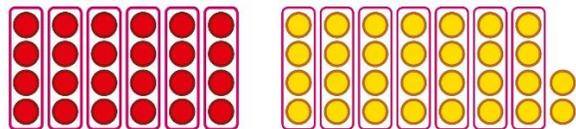
$$500 \times 7 = 3500$$

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

Year 6 - Division

Understanding factors

Use equipment to explore different factors of a number.



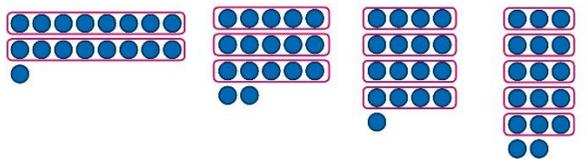
$24 \div 4 = 6$

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

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

Understanding factors

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



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

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

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

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

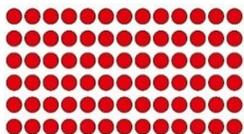
Understanding factors

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 single digit

Use equipment to make groups from a total.



There are 78 in total.

There are 6 groups of 13.

There are 13 groups of 6.

Dividing by a single digit

H	T	O	How many groups of 6 are in 100? $6 \overline{) 100}$
●	●●●	●●	
H	T	O	How many groups of 6 are in 13 tens? $6 \overline{) 130}$
●	●●●●●●	●●	
H	T	O	How many groups of 6 are in 12 ones? $6 \overline{) 12}$
	●●●●●●	●●●●●●	

Dividing by a single digit

Use short division to divide by a single digit.

$$6 \overline{) 132}$$

$$6 \overline{) 132}$$

$$6 \overline{) 132}$$

Use an area model to link multiplication and division.

?	10	10	1	1
6	132	60	60	6
$6 \times ? = 132$				
6	120	12		
$132 = 120 + 12$				
$132 \div 6 = 20 + 2 = 22$				

Dividing by a 2-digit number using factors

Understand that division by factors can be used when dividing by a number that is not prime.

Dividing by a 2-digit number using factors

Use factors and repeated division.

$$1,260 \div 14 = ?$$



$$1,260 \div 2 = 630$$

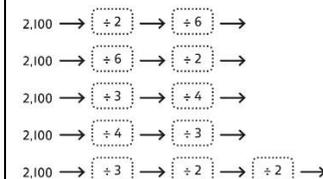
$$630 \div 7 = 90$$

$$1,260 \div 14 = 90$$

Dividing by a 2-digit number using factors

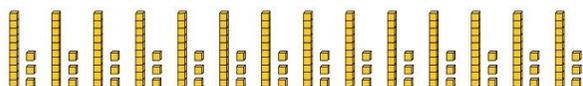
Use factors and repeated division where appropriate.

$$2,100 \div 12 = ?$$



Dividing by a 2-digit number using long division

Use equipment to build numbers from groups.

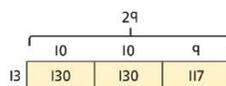
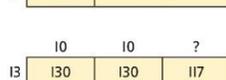
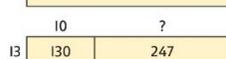
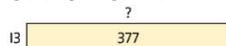


182 divided into groups of 13.
There are 14 groups.

Dividing by a 2-digit number using long division

Use a bar model alongside written division to model the process.

$$377 \div 13 = ?$$



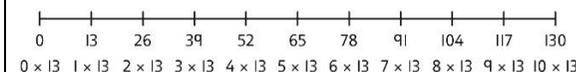
$$377 \div 13 = 29$$

Dividing by a 2-digit number using long division

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.

$$377 \div 13 = ?$$



$$\begin{array}{r} 13 \overline{) 377} \\ - 130 \quad 10 \\ \hline 247 \\ - 130 \quad 10 \\ \hline 117 \\ - 117 \quad 9 \\ \hline 0 \quad 29 \end{array}$$

$$377 \div 13 = 29$$

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

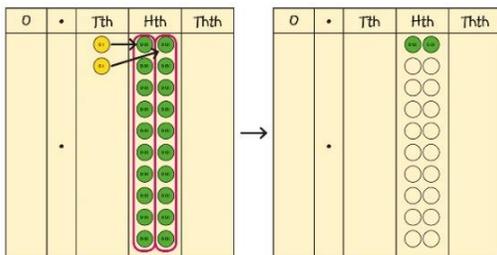
$$\begin{array}{r} 3 \\ 21 \overline{) 798} \\ - 630 \\ \hline 168 \end{array}$$

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

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.



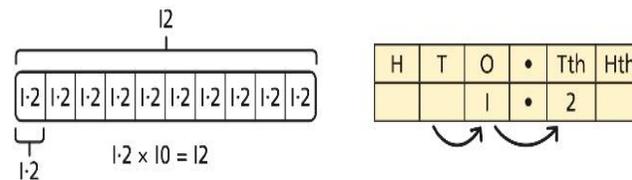
Exchange each 0.1 for ten 0.01s.

Divide 20 counters by 10.

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

Dividing by 10, 100 and 1,000

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.

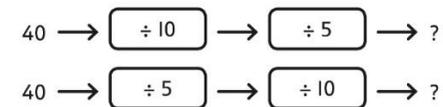


Understand how to divide using division by 10, 100 and 1,000.

Dividing by 10, 100 and 1,000

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

$$40 \div 50 = \square$$



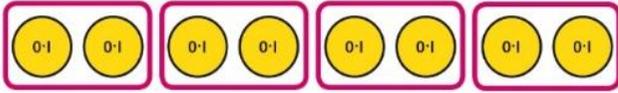
$$40 \div 5 = 8$$

$$8 \div 10 = 0.8$$

So, $40 \div 50 = 0.8$

Dividing decimals

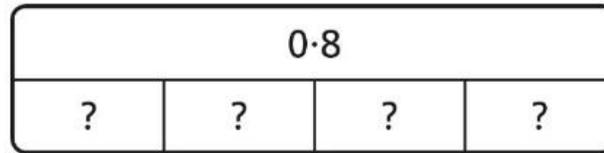
Use place value equipment to explore division of decimals.



8 tenths divided into 4 groups. 2 tenths in each group.

Dividing decimals

Use a bar model to represent divisions.



$$4 \times 2 = 8$$

$$8 \div 4 = 2$$

$$\text{So, } 4 \times 0.2 = 0.8$$

$$0.8 \div 4 = 0.2$$

Dividing decimals

Use short division to divide decimals with up to 2 decimal places.

$$\begin{array}{r}
 . \\
 8 \overline{) 4.24} \\
 \underline{0} \\
 8 \overline{) 4.24} \\
 \underline{0} \\
 8 \overline{) 4.24} \\
 \underline{0} \\
 8 \overline{) 4.24}
 \end{array}$$