Bryn Offa CE Primary School

Calculation Policy

Introduction

At Bryn Offa, we aim for all of our pupils to be fully numerate and have a real sense of number. We recognise the importance of both mental methods that are high on understanding and formal written methods that are low on understanding but may be more efficient (depending on the context and numbers involved).

- It is essential that there is a consistency in terminology used.
- The methods for each operation are taught in an agreed way.
- The methods are taught in a progressive way, that take account of the small steps of learning.

We follow a progression for each operation (addition, subtraction, multiplication and division). It is vital that pupils are taught according to the level that they are currently working at, being moved onto the next level as soon as they are ready, or working at a lower level until they are **confident** enough to move on. Where year groups are assigned to a method, will indicate where this will be **typically** introduced. Progression through teaching of calculation strategies does not mean that previous skills are replaced, merely added to. All children should be challenged through sophisticated and diverse problems and reasoning to deepen their understanding before being introduced to new content.

Learning of calculation methods should always begin with concrete experiences (using manipulatives) followed by pictorial/visual representations (models and images) before finally becoming abstract (use of symbols).

Pupils should be encouraged to ask themselves:

- Can I do it in my head?

- Do I need to make jottings?

- Do I need to use a formal column method?

Date Approved	Summer 2026
Next review date	Every 3 years (or sooner if required)

Reception – ADDITION

- **Conceptually subitise to 5.**
- **Knows that a group of things change in quantity when something is added.**
- **Finds the total number of items in two groups by counting all of them.**
- **Finds one more from a group of up to 5 objects / then 10 objects.**
- **Use vocabulary involved in adding when doing practical activities.**

Counting

2 + 1 =

Count out each set then find the total

Practical

1 more

5 + 1=

10 + 1 =

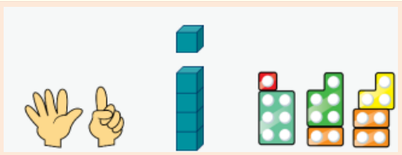
Use a range of practical equipment to calculate 1 more including but not limited to cubes, teddies, buttons and counters

Numicon

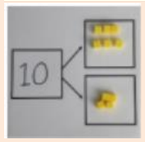
3+2=

Use Numicon to solve addition of single digit numbers.

How many ways can you make ...?



Part/Part/Whole



Use Part/Part/Whole model. Use cubes to add two numbers together as a group

Tens Frames

Recall of number bonds to 10 with visual aids

Reasoning Mathematically and Solving Problems

Pupils need to use and apply their understanding of, and fluency in, addition to:

- solve one-step problems that involve addition, using concrete objects and pictorial representations
- solve one-step problems that involve addition in familiar contexts, e.g. money

Key Vocabulary:

Numeral, digit, partition, subitise, number, quantity, add, more, plus, sum, and, make, altogether, total, equal to, equals, double, most, count on, number track, Part/Part/Whole, Tens frame, score, one more, two more, ten more…, how many altogether?, how many more to make… ?, how many more is… than…?, tens, ones, estimate, addition

Mental Strategies:

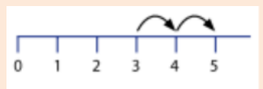
Develop a mental image of the number system

Understand the value of a number

Counting forwards and backwards

Recall of number bonds to 10

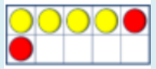
Use of models and images - concrete objects/pictorial representations - number tracks and number lines



Year 1 – ADDITION

- **Represent and use number bond facts within 20.**
- **Add one-digit and two-digit numbers to 20, including zero.**
- **Read, write and interpret mathematical statements involving addition (+) and equals (=) signs.**
- **Solve one-step problems that involve addition using concrete objects and pictorial representations, and missing number problems such as 7 = □ - 9.**

Counting

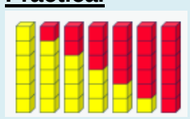


Using key resources of (but not limited to) counters, ten frames and bead strings.

2 + 5 =

Count on from first number (Cover first number or display as numeral)

Practical



Children practically develop their knowledge of number bonds to 10 before writing the corresponding calculations.

2 + 5

Leading to

5 +

5 + 2 (without counters)

Recognise the biggest number in the calculation and count on from it (using objects for smaller number if necessary)

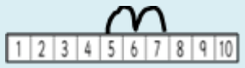
Numicon

12+6=

Use Numicon to solve addition of two-digit and single-digit numbers.

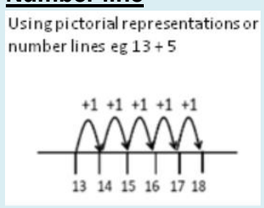
Number track

5+2=



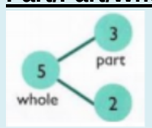
Count on using the number track by saying start on 5, count on 1,2, what number are you on? Starting at the biggest number and counting on.

Number line

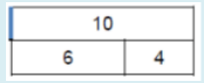


Recognise the biggest number in the calculation and count on from it mentally or using number line

Part/Part/Whole



Bar Model



Number Bonds within 10 and 20

$4 + 2 = 6$
$2 + 4 = 6$

$6 = 4 + 2$
$6 = 2 + 4$

$5 + 2 = 7$
$15 + 2 = 17$

$7 = 5 + 2$
$17 = 15 + 2$

Partition Using Tens Frames

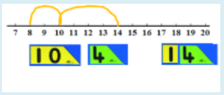
Partition small numbers: 6 + 5 becomes 6 + 4 + 1

Partition and combine tens and ones: 12 + 7 becomes 10 + 2 + 7

Regrouping to make 10

Number line and partitioning

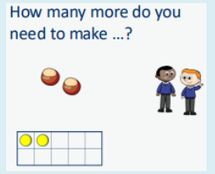
6 + 8 becomes 8 + 2 + 4

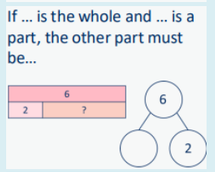


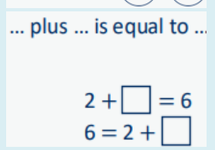
Partitioning the smaller number and use the tens number to bridge calculation
5 + 17 becomes 17 + 3 + 2

Missing Number Problems

Children are encouraged to make links to known facts







Key Vocabulary:

Commutative, numeral, digit, partition, subitise, number, quantity, add, more, plus, sum, and, make, altogether, total, equal to, equals, double, inverse double, near double, equals, is the same as (including equals sign), most, count on, number track, number line, Part/Part/Whole, Tens frame, score, number bonds, one more, two more, ten more…, how many more to make… ?, how many more is… than…?, how much more is…?, tens, ones, estimate, addition, fact family, If I know ... then I know ...?, missing number

Mental Strategies:

Know addition can be carried out in any order (commutative)
Add 1 and 2 digit numbers to 20 including 0
Number bonds to 20
Doubles of numbers up to and including double 10
Adding 10 to a single digit number
Identify 1 more than a given number

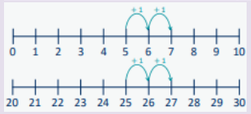
Year 2 – ADDITION

- **Recall and use addition facts to 20 fluently and derive and use related facts up to 100.**
- **Add numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones; a two-digit number and tens.**
- **Two two-digit numbers.**
- **Adding three one-digit numbers.**
- **Show that addition of two numbers can be done in any order (commutative).**
- **Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.**
- **Solve problems with addition: using concrete objects and pictorial representations, including those involving numbers, quantities and measures and applying their increasing knowledge of mental and written methods; solve simple problems in a practical context involving addition of money of the same unit.**

Counting on and partitioning

Tens Frames to count on and partition

Number lines to count on and partition



5 + 2 = 7

25 + 2 = 27

8 + 5 = 13

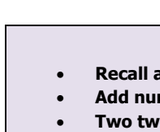
The second number line shows that children are taught to partition the smaller number through the multiple of 10

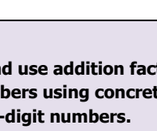
28 + 5 =

28 + 2 + 3 = 33

Part-Whole models

These are used to represent partitioning in an abstract format.



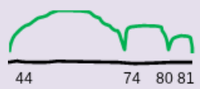


Blank number lines

TO + TO within 100

Children are expected to draw their own number lines to solve addition problems.

37 + 44 = 81



Children count in groups of ten and one from largest number

Special cases + 9

9 + 33

Using Doubles

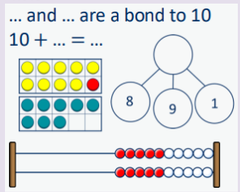
29 + 30 is the same as

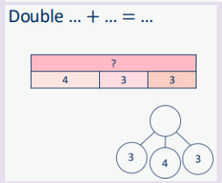
30 + 30 – 1

NB: Children are expected to draw their own number lines to solve addition problems.

Add three 1-digit numbers

Children are prompted to understand that addition is commutative (can be done in any order) and to make links to known facts

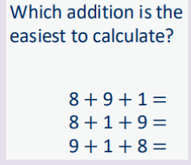




6 + 9 + 3 =

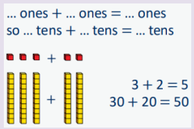
6 + 3 = 9

Double 9 = 18

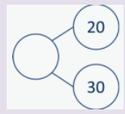


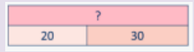
Add multiples of 10

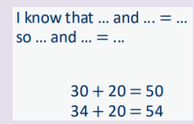
Make links to known facts within 10

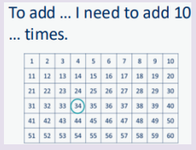


Children use base 10 to support their learning



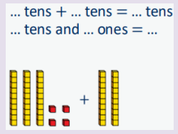






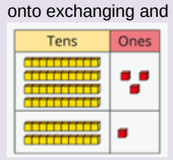
Children use 100 squares to support their learning

Add 10s to any number



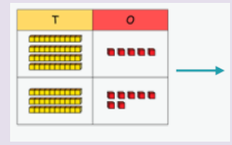
TO + TO within 100

Partition to add using base 10. It is important to model adding the ones first as this will help children as they move onto exchanging and column addition.



… ones + … ones = … ones

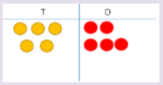
… tens + … tens = … tens



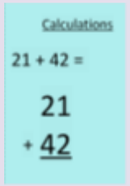
There are … ones so I need to make an exchange. … ones = … tens + … ones

Column Addition

After practically using the base 10 and place value counters, children can draw the counters in a place value chart to solve addition.



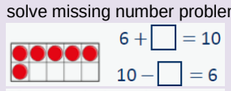
Children can then move onto formal written column addition. This should be shown alongside their concrete method along with part-whole models and bar models.

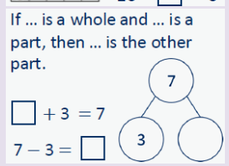


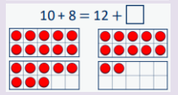
When initially introducing written strategies, simpler calculations (which would normally be solved mentally) may be used to demonstrate the method before progressing onto more challenging calculations.

Missing Number Problems

Children are introduced to the inverse and can use this to check answers as well as solve missing number problems.







Key Vocabulary:

Commutative, numeral, digit, partition, subitise, number, quantity, add, more, plus, sum, and, make, altogether, total, equal to, equals, double, near double, equals, is the same as (including equals sign), most, count on, number track, number line, Part/Part/Whole, Tens frame, score, number bonds, one more…, two more…, ten more…, one hundred more…, how many more to make… ?, how many more is… than…?, how much more is…?, tens boundary, regrouping, columns, tens, ones, estimate addition, inverse, regroup

Mental Strategies:

Know that addition is the inverse of subtraction

Add numbers mentally, including:

- A 2-digit number and ones
- A multiple of 10 to a 2-digit number
- Two 2-digit numbers
- Three 1-digit numbers

Use knowledge of inverse to check calculations and solve missing number problems

Use knowledge of number bonds to 10 to calculate numbers bonds to 100

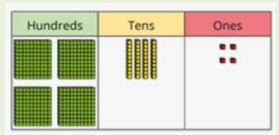
Count on in tens from any given number (e.g 19 – 29 – 39 – 49 etc)

Year 3 – ADDITION

- **Add and subtract numbers mentally, including: a three-digit number and ones; a three-digit number and tens; a three-digit number and hundreds.**
- **Add numbers with up to three digits, using formal written methods of columnar addition and subtraction.**
- **Estimate the answer to a calculation and use inverse operations to check answers.**
- **Solve problems, including missing number problems, using number facts, place value, and more complex addition.**
- **Add fractions with the same denominator within 1 whole.**
- **Calculate the time taken by particular events or tasks.**

Add 1s, 10s or 100s to a 3-digit number

The ones/tens/hundreds column will increase by …



444 + 5 =
444 + 50 =
444 + 500 =

777 + 2 =
777 + 20 =
777 + 200 =

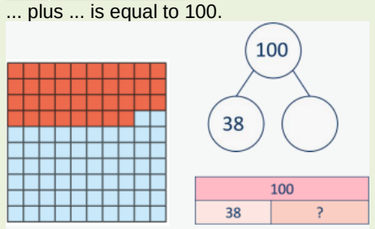
Prompt children to notice which digit changes to ensure place value knowledge is secure.

Special cases

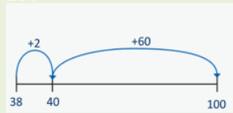
66 + 79
80 +66 – 1 = 145

Using doubles
76 + 78
Double 70 + double 6 + 2
Double 70 + double 8 – 2

Complements to 100
... plus ... is equal to 100.



I add … to get to the next 10, then ... to get to 100



38 + 62 = 100
62 + 38 = 100
100 = 38 + 62
100 = 62 + 38

Reinforce fact families and inverses for checking answers.

Discuss cases where column addition is not the most efficient method

356 + 8
356 + 4 + 4 = 364

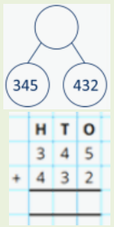
356 + 70
350 + 70 + 6 = 420

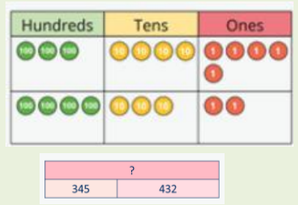
356 + 600
300 + 600 + 56 = 956

Revise strategy on a number line for those needing visual support

Add 2 numbers – Column method (no exchange)

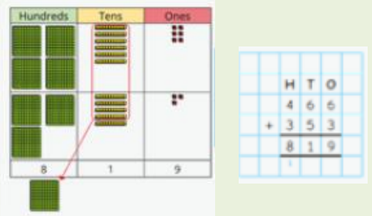
… ones + … ones = … ones
… tens + … tens = … tens
… hundreds + … hundreds = … hundreds





Add 2 numbers – Column method (exchange)

This can also include a 3-digit number plus a 2-digit number.
There are … ones, so I do/do not need to make an exchange.
There are … tens, so I do/do not need to make an exchange.
… ones = … tens and … ones.
… tens = … hundreds and … tens.

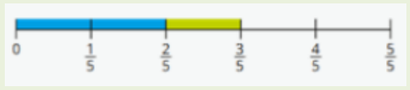


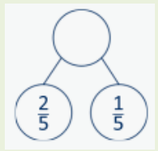
It is vital that we give children the opportunity to independently lay out their column addition ensuring 0 is used as a place holder where necessary.

Add fractions with the same denominator within 1 whole

Make links with known facts

When adding fractions with the same denominator, I only add the numerator.
… fifths + … fifths = … fifths

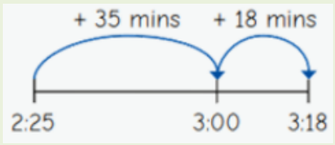


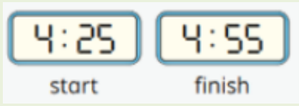


Calculate the duration of events

Find durations of time between a given start and end point. Children will need to calculate complements to 60.

Children should use mini-geared clocks to aid calculations.
From … to … o'clock is … minutes.
From … o'clock to … is … minutes.
The total time taken is … minutes.





Key Vocabulary:
Commutative, numeral, digit, partition, subitise, number, quantity, add, more, plus, sum, and, make, altogether, total, equal to, equals, double, inverse double, near double, equals, is the same as (including equals sign), most, count on, number track, number line, Part/Part/Whole, Tens frame, score, number bonds, one more…, two more…, ten more…, one hundred more…, how many more to make… ?, how many more is… than…?, how much more is…?, tens boundary, hundreds boundary, regrouping, columns, tens, ones, estimate, regroup, thousands, increase, fractions, numerator, denominator, inverse, efficient, complements

Mental Strategies:
Add numbers mentally, including:
- a three-digit number and a single digit number
- a 3-digit number and multiples of 10
- a 3-digit number and multiples of 100

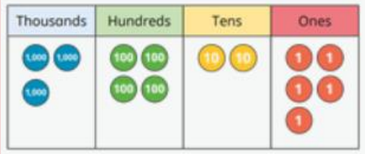
Estimate the answer to a calculation and use inverse operations to check answers
Know number pairs that total 1000 (multiples of 100)
Calculate 10 or 100 more than any given number

Year 4 – ADDITION

- **Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate.**
- **Estimate and use inverse operations to check answers to a calculation.**
- **Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.**
- **Solve simple measure and money problems including those involving fractions and decimals up to 2 decimal places.**
- **Add fractions with the same denominator.**

Add 1s, 10s and 100s to a 4-digit number

Emphasis on mental strategies including number bonds and related facts. Prompt children to notice which digit changes.



3,425 + 3 = 3,425 + 300 =
3,425 + 30 = 3,425 + 3,000 =

The ones/tens/hundreds/thousands column will increase by …

What patterns do you notice?

2,350 + 3 =
2,350 + 30 =
2,350 + 300 =
2,350 + 3,000 =

6,040 + 200 =
6,040 + 500 =
6,040 + 900 =

2,211 + ☐ = 2,251
2,211 + ☐ = 2,215
2,211 + ☐ = 2,511

Using mental strategy where appropriate

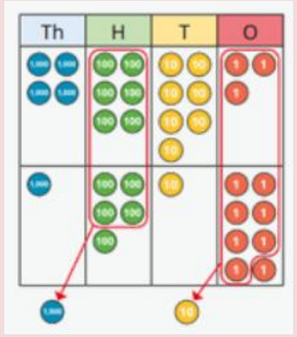
1460 + 499
1460 + 500 – 1 = 1959

1460 + 999
1460 + 1000 – 1 = 1559

2560 + 3570
2500 + 60 + 3500 + 70 =
2500 + 3500 + 60 + 70 =
6000 + 130 = 6130

Add up to two 4-digit numbers

Formal written method with up to 3 exchanges. Encourage children to estimate and use inverse operations to check answers to calculations.



There are … ones/tens/hundreds so I do/do not need to make an exchange.
I can exchange 10 … for 1 …

	Th	H	T	O
	4	6	7	3
+	1	5	1	8
	6	1	9	1

It is vital that we give children the opportunity to complete additions involving a 4-digit number and a 3-digit number as well as independently laying out their column addition, ensuring 0 is used as a place holder where necessary.

Add decimal numbers as well as in the context of money

1.5 + 1.5
Double 1 and double 0.5

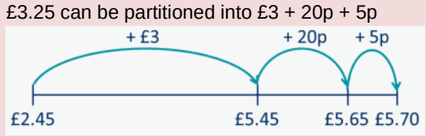
Emphasis on partitioning and use of number lines initially rather than formal written calculations.

1.6 + 1.7
1.7 + 0.3 + 1.3 = 3.3

… pence + … pence = … pence
… pounds + … pounds = … pounds

45p + 25p = 70p
£2 + £3 = £5
£5 + 70p = £5.70

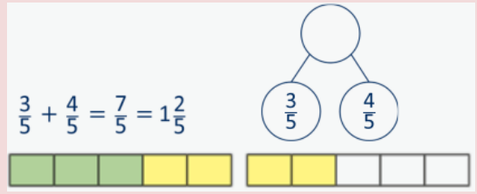
£3.25 can be partitioned into £3 + 20p + 5p

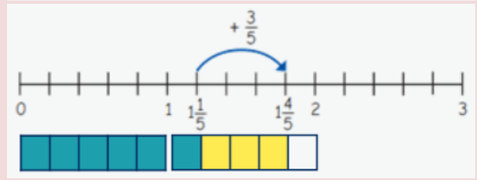


	4	•	4	5
+	3	•	2	1
		•		

Add fractions and mixed numbers with the same denominator beyond 1 whole

When adding fractions with the same denominator, I only add the numerator.
… fifths + … fifths = … fifths





Key Vocabulary:
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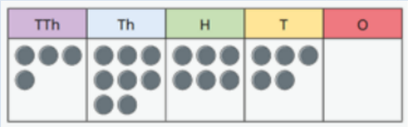
Mental Strategies:
Add numbers mentally, including:
a four digit number and multiples of one thousand
Use knowledge of doubles to derive related facts (e.g 15 + 16 = 31 because 15 + 15 = 30 and 30 + 1 = 31)
Know number pairs that total 1000 (multiples of 10)
Estimate the answer to a calculation and use inverse operations to check answers

Year 5 – ADDITION

- **Add numbers mentally with increasingly large numbers.**
- **Add whole numbers with more than 4 digits, including using formal written methods (column addition).**
- **Add decimals with up to 3 decimal places.**
- **Add fractions, which have denominators that are a multiple of one another.**
- **Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.**
- **Solve addition multi-step problems in contexts, deciding which operations and methods to use and why.**

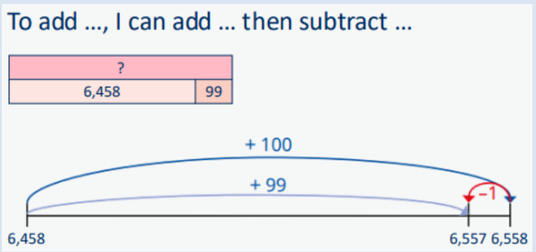
Using mental strategies

Add 1s, 10s, 100s, etc. to any number.
Use number bonds and related facts from previous years.



45678 + 3500 =
45678 + 3000 = 48678
42678 + 500 = 49178

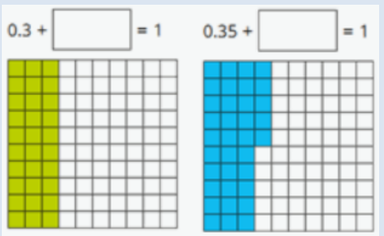
48,650 + 300 =
48,650 + 30,000 =
48,650 + 30 =

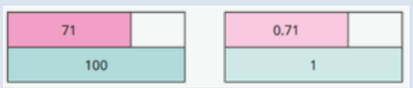


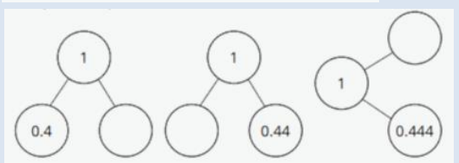
It is important to discuss other situations where this applies e.g. add 95.

Complements to 1

Pairs of numbers with up to 3 decimal places which total 1
Encourage children to make links with bonds to 10 and complements to 100 and 1,000





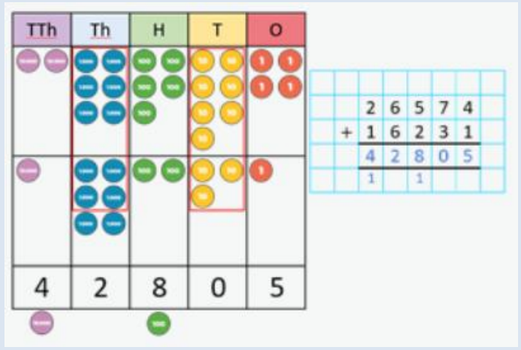


4 + 6 = 10
44 + 56 = 100
444 + 556 = 1,000

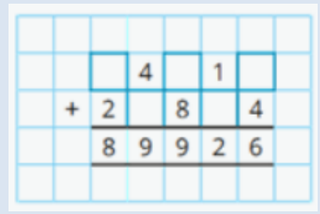
0.4 + 0.6 = 1
0.44 + 0.56 = 1
0.444 + 0.556 = 1

Column addition

Encourage children to estimate and use inverse operations to check answers to calculations.



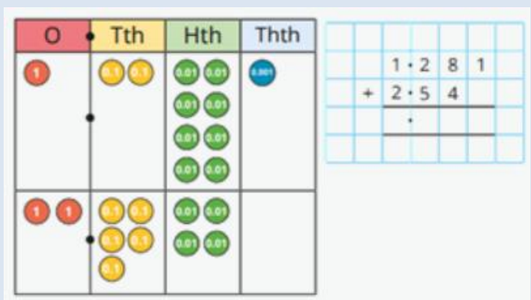
I can exchange 10 … for 1 …



These questions build on missing number problems from previous years and ensure children have a secure understanding of exchanging.

When adding decimals, children should progress in the following sequence:

1. Same number of decimal places with no exchange;
2. Same number of decimal places with an exchange;
3. Different number of decimal places with no exchange;
4. Different number of decimal places with an exchange.

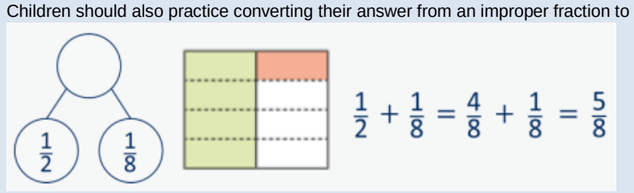


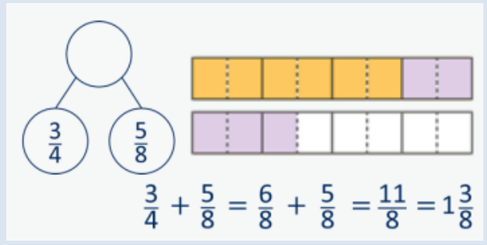
I do/do not need to make an exchange because …
I can exchange 10 … for 1 …

It is vital that we give children the opportunity to independently lay out their column addition ensuring 0 is used as a place holder where necessary and decimal points are placed accurately.

Add fractions with denominators that are a multiple of one another

Encourage children to convert fractions to the same denominator before adding.
Progress from adding fractions within 1 whole to adding fractions beyond 1 whole.
Children should also practice converting their answer from an improper fraction to a mixed number.





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Mental Strategies:

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

Year 6 – ADDITION

- **Perform mental calculations, including with mixed operations and large numbers.**
- **Use their knowledge of the order of operations to carry out calculations involving the four operations.**
- **Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.**
- **Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.**
- **Calculate intervals across zero.**
- **Add fractions with different denominators and mixed numbers, using the concept of equivalent fractions.**

Column Addition

Add integers up to 10 million

		3	4	6	2	2	1
+		1	8	4	3	2	1
		5	3	0	5	4	2
		1	1				

Encourage children to estimate and use inverse operations to check answers to calculations.

?		
2,354	750	1,500

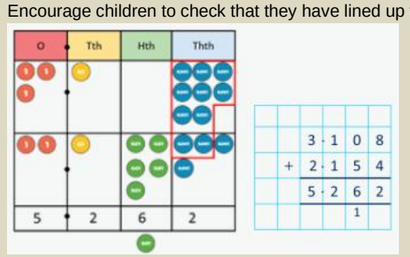
Questions like this one provide opportunities for children to discuss the most efficient method for them, which may not involve column addition.

		8	1		8	5	
+				0	6		
		9	9	5		8	

These questions build on missing number problems from previous years and ensure children have a secure understanding of exchanging.

Add decimals with up to 3 decimal places

Progress to numbers with digits in different place value columns.
Encourage children to check that they have lined up the columns correctly.

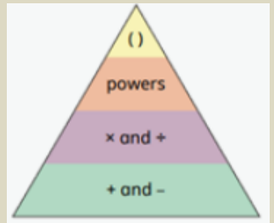


	3	1	0	8
+	2	1	5	4
	5	2	6	2
				1

I do/do not need to make an exchange because …

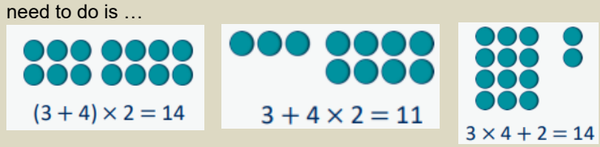
		1	5	0	2	7	
+			9	5	8		
		2	4	6	0	7	
		1		1			

Order of Operations



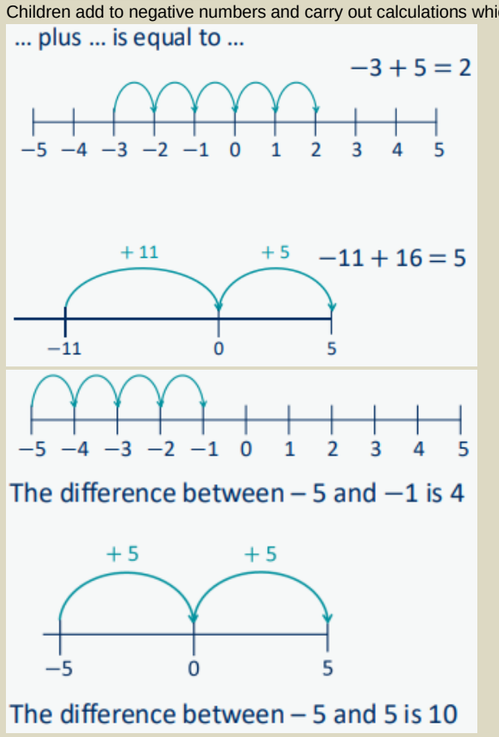
Calculations in brackets should be done first. Multiplication and division should be performed before addition and subtraction. *When no brackets are shown and the operations have the same priority, work left to route.

… has greater priority than …, so the first part of the calculation I need to do is …



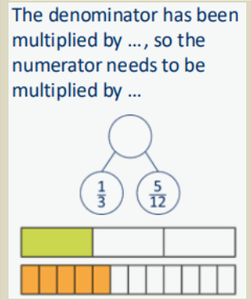
Negative Numbers

Children add to negative numbers and carry out calculations which cross 0

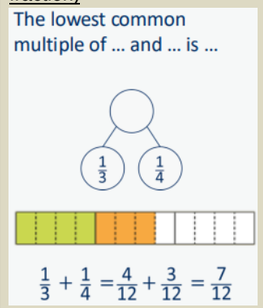


Add fractions

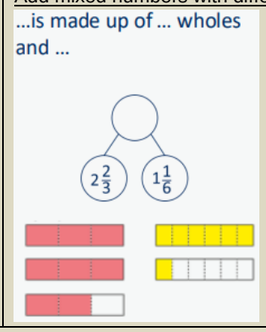
Convert fractions to the same denominator before adding (where one denominator is a multiple of the other)



Convert fractions to the same denominator before adding (any fraction)



Add mixed numbers with different denominators



Key Vocabulary:

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Mental Strategies:

Add numbers mentally with increasingly large numbers (e.g 10,162 + 2,300 = 12,462)
Add decimal numbers mentally (up to 2 decimal places)
Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.

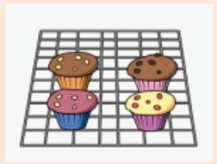
Reception - SUBTRACTION

- **Know that a group of things changes in quantity when something is taken away.**
- **Subitise (recognise quantities without counting) up to 5.**
- **Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (and some subtraction facts) and some number bonds to 10, including double facts.**
- **Finds 1 less from a group of 5 objects then 10 objects.**
- **In practical activities, beginning to use the vocabulary of subtracting.**
- **Subtract 2 single-digit numbers.**

Conceptually subitise to 5

Notice the parts that make up the whole.

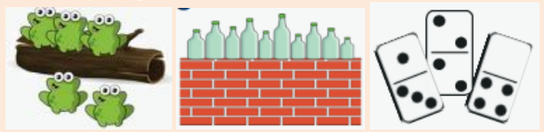
What do you see?
How do you see it?



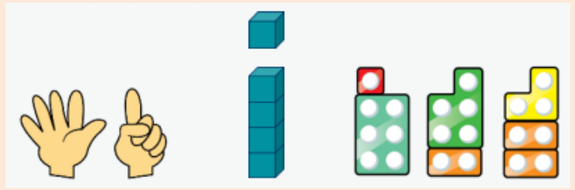
Notice the composition of numbers within 10

Link to stories, songs and rhymes.

How many…?
How many…?
How many altogether?



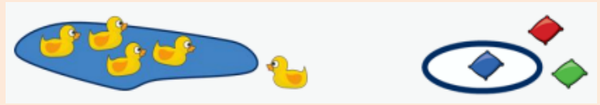
How many ways can you make…?



Partition

Using objects, explore different ways to partition a number into 2 or more Parts.

There are … altogether.
I can see … here and … there.

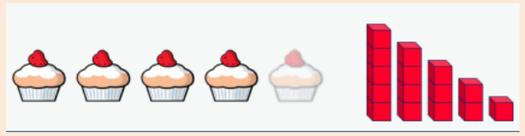


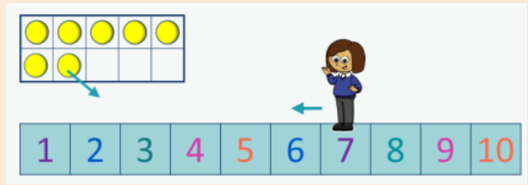
… and … make …

1 less

Continue to link to stories, songs and rhymes.

1 less than ... is ...

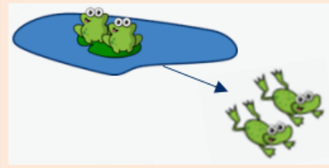


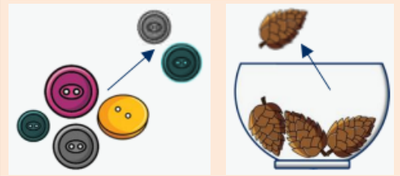


Take away

A quantity is reduced.

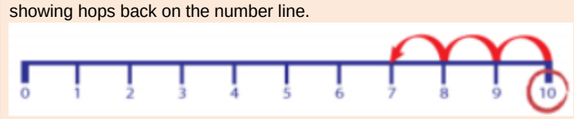
I have …
I take … away
Now I have …





Number lines

Number lines can be used alongside number tracks and practical apparatus to solve subtraction calculations and word problems. Children count back showing hops back on the number line.



Key Vocabulary:

subtract, subtraction, take (away), leave, minus, less than, how many are left/left over?, how many have gone?, one less, two less… ten less…,how many fewer is… than…?, difference between, is the same as, partition, subitise, number, difference

Mental Strategies:

Develop a mental image of the number system
Children count backwards using familiar number rhymes (e.g '10 Green Bottles', '5 Fat Sausages')
Count backwards from different starting points
Use of models and images:
- concrete objects/pictorial representations
- number tracks and number lines: 'take away' (counting back)

Year 1 - SUBTRACTION

- **Given a number, identify one less.**
- **Represent and use number bonds and related subtraction facts within 20.**
- **Subtract one digit and two-digit numbers to 20, including zero.**
- **Read, write and interpret mathematical statements involving subtraction (-) and equals (=) signs.**
- **Solve one-step problems that involve subtraction using concrete objects and pictorial representations, and missing number problems such as 7 = * - 9.**

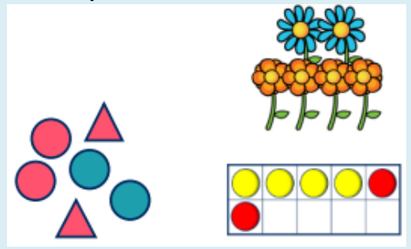
Find a part

Link to number bonds and known facts. E.g. 2 + 4 = 6 so if 6 is the whole and 4 is a part, the other part must be 2.

There are … in total.

… are …

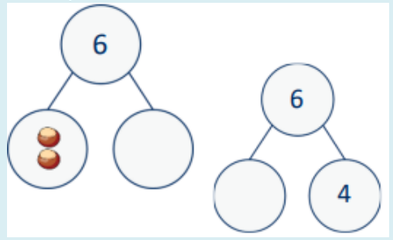
How many are not …?



… is the whole.

… is a part.

… is a part



… subtract … is equal to …

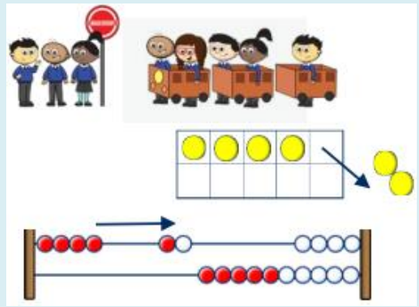
… is equal to … − …

6 − 2 = 4
6 − 4 = 2
4 = 6 − 2
2 = 6 − 4

Take away

A quantity is decreased.

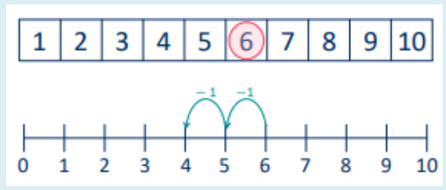
First… Then… Now…



I start at …

I jump back …

I land on …



… minus … is equal to …

… is equal to … − …

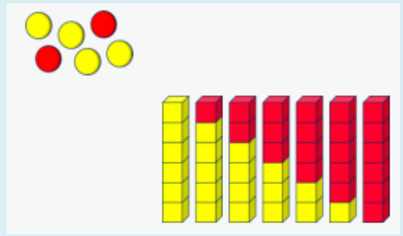
6 − 2 = 4
6 − 4 = 2
4 = 6 − 2
2 = 6 − 4

Bonds within 10

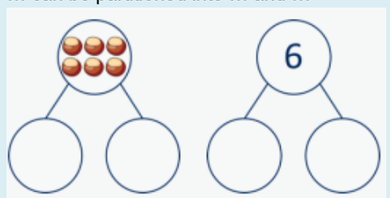
Focus on subtraction facts. Encourage children to notice patterns.

… is made of … and …

… and … make …



… can be partitioned into … and …



… minus … is equal to …

6 − 0 = 6
6 − 1 = 5
6 − 2 = 4
6 − 3 = 3
6 − 4 = 2
6 − 5 = 1
6 − 6 = 0

Related facts within 20

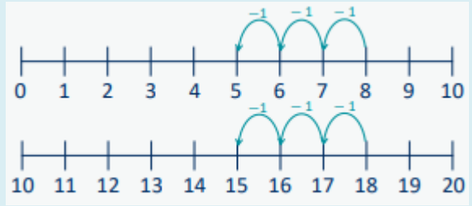
Make links to known facts.

I know that … minus ... = …

so … minus … = ...

… less than … is …

so … less than … is …



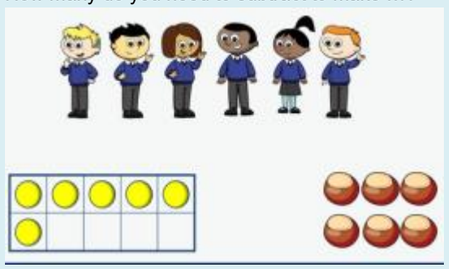
What patterns do you notice?

8 − 3 = 5
18 − 3 = 15
5 = 8 − 3
15 = 18 − 3

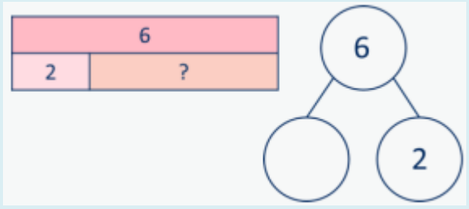
Missing numbers

Make links to known facts.

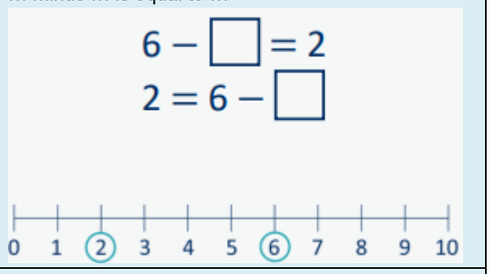
How many do you need to subtract to make …?



If … is the whole and … is a part, the other part must be…



… minus … is equal to …



Key Vocabulary:

subtract, subtraction, take (away), leave, minus, less than, how many are left/left over?, how many have gone?, one less, two less… ten less…,how many fewer is… than…?, difference between, is the same as, numeral, partition, subitise, number, change, estimate, difference, leave, half, halve, how many are left/left over?, how many are gone?, how much less is…?, =, equals, sign, is the same as, count on, count back, difference between, how many more is…than..?, how much more is..?, fact family

Mental Strategies:

Subtract 1 and 2 digit numbers to 20 including 0

To know that subtraction is not commutative and that the larger number must always come first

Use knowledge of number bonds to 10 and 20 to reason (9 + 1 = 10 so 10 – 9 = 1 and 10 – 1 = 9)

Year 2 - SUBTRACTION

- **Recall and use subtraction facts to 20 fluently and derive and use related facts up to 100.**
- **Subtract numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones; a two-digit number and tens; two two-digit numbers.**
- **Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot.**
- **Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.**
- **Solve problems with subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures; applying their increasing knowledge of mental and written methods.**

Subtract ones from any number

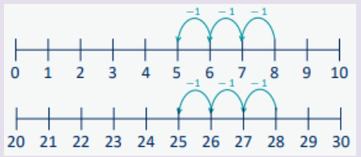
Make links to known facts.

I know that … minus ... = …

so … minus … = ...

… less than … is …

so … less than … is …



NB: Children are expected to draw their own number lines to solve addition problems.

What do you notice?

Can you continue the pattern?

8 − 3 = 5

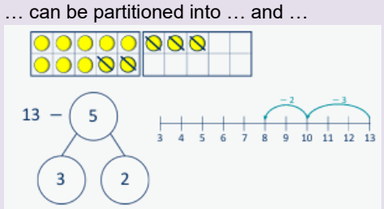
18 − 3 = 15

28 − 3 = 2

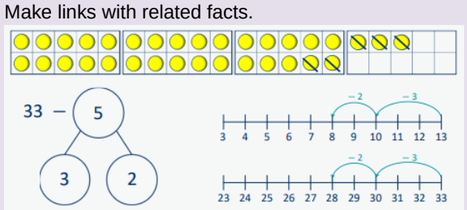
Subtract across a 10

Partition the number being subtracted to bridge through a ten.

… can be partitioned into … and …



Make links with related facts.



Special case – 9 or – 19

28 – 9 = 28 – 10 + 1 = 19

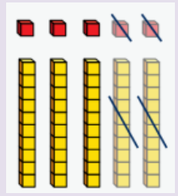
28 – 19 = 28 – 20 + 1 = 9

Subtract multiples of 10

Make links to known facts within ten.

… ones − … ones = … ones

so … tens − … tens = … tens

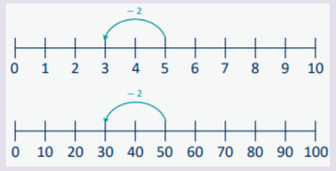


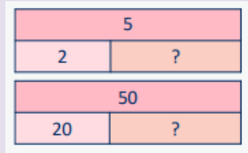
5 − 2 = 3

50 − 20 = 30

What is the same?

What is different?



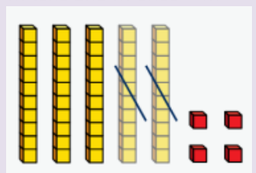


Subtract 10s from any number

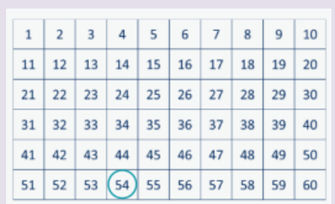
Make links to known facts.

… tens − … tens = … tens

… tens and … ones = …



To subtract … I need to subtract 10 … times.



I know that … minus ... = …

so … minus … = ...

50 − 20 = 30

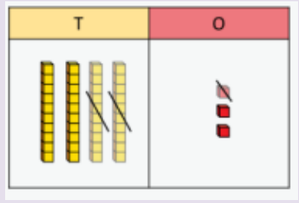
54 − 20 = 34

Subtract two 2-digit numbers (not across a ten)

… ones − … ones = … ones

… tens − … tens = … tens

It is important to model subtracting the ones first as this will help children as they move onto exchanging and column subtraction.

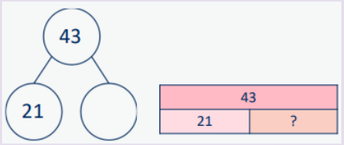


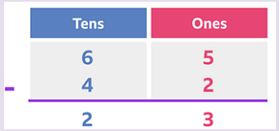
3 ones − 1 one = 2 ones

4 tens − 2 tens = 2 tens

2 tens and 2 ones = 22

Alongside exploring this practically with Base 10 and place value counters, children should see part-whole models and bar models before moving on to formal column subtraction.

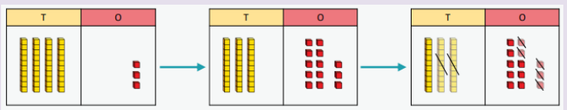




Subtract two 2-digit numbers (across a ten)

Begin to exchange 1 ten for 10 ones.

I need to make an exchange because I do not have enough ones to subtract … ones.



3 ones − 5 ones

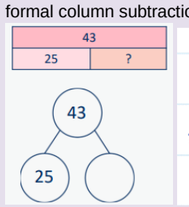
(I need to exchange 1 ten for 10 ones)

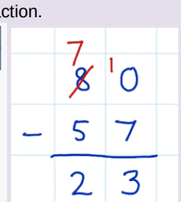
13 ones − 5 ones = 8 ones

3 tens − 2 tens = 1 ten

1 ten and 8 ones = 18

Alongside exploring this practically with Base 10 and place value counters, children should see part-whole models and bar models before moving on to formal column subtraction.

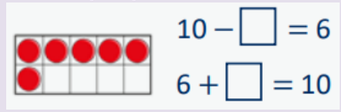




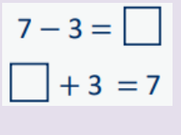
Missing numbers

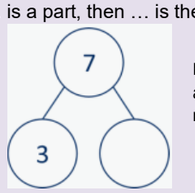
Solve missing number problems and use the inverse to check.

How many do you need to subtract to make …?



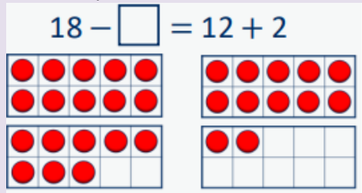
If … is a whole and … is a part, then … is the other part.





Bar models can be used as well as part-whole models here.

… can be partitioned into … and …



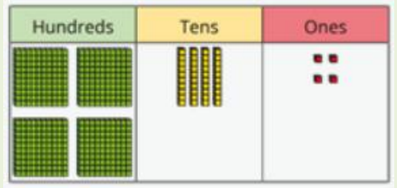
Key Vocabulary: subtract, subtraction, take (away), leave, minus, less than, how many are left/left over?, how many have gone?, one less, two less… ten less…, how many fewer is… than…?, difference between, is the same as, numeral, partition, subitise, number, change, estimate, difference, leave, half, halve, how many are left/left over?, how many are gone?, how much less is…?, =, equals, sign, is the same as, count on, count back, difference between, how many more is…than..?, how much more is..?, column subtraction, exchange, multiples of tens, fact family, inverse, efficient
Mental Strategies: To know that subtraction is the inverse of addition Use knowledge of inverse to check calculations and solve missing number problems Subtract numbers mentally, including: subtracting units from a 2-digit number subtracting a multiple of 10 from a 2-digit number subtracting a 2-digit number from another 2-digit number Recall and use subtraction facts to 20 fluently Use knowledge of number bonds to 100 (multiples of 10) to reason (40 + 60 = 100 so 100 – 60 = 40 and 100 – 40 = 60)

Year 3 - SUBTRACTION

- **Subtract numbers mentally, including: a three-digit number and ones; a three-digit number and tens; a three-digit number and hundreds.**
- **Subtract numbers with up to three digits, using formal written methods of columnar subtraction.**
- **Estimate the answer to a calculation and use inverse operations to check answers.**
- **Solve problems, including missing number problems, using number facts, place value, and more complex subtraction.**
- **Subtract fractions with the same denominator within 1 whole.**

Subtract 1s, 10s and 100s from a 3-digit number

Emphasis on mental strategies including number bonds and related facts.
Prompt children to notice which digit changes.
The ones/tens/hundreds column will decrease by …



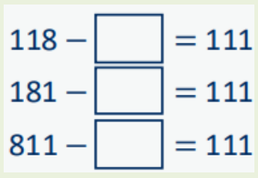
444 − 2 =
444 − 20 =
444 − 200 =

777 − 4 =
777 − 40 =
777 − 400 =

What patterns do you notice?

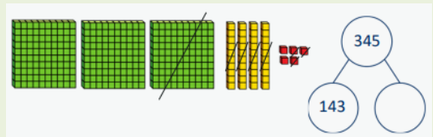
235 − 3 =
235 − 30 =
235 − 300 =

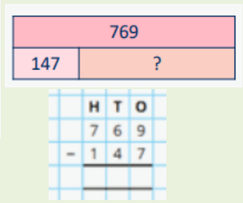
624 − 20 =
654 − 50 =
694 − 90 =



Subtract two numbers (no exchange)

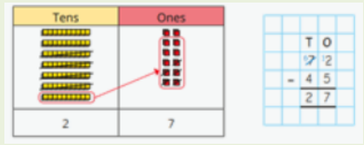
Mental strategies and formal written method. Children should continue to develop their missing number skills by exploring inverses.
... ones − … ones = … ones
... tens − … tens = … tens
... hundreds − … hundreds = … hundreds
Alongside exploring this practically with Base 10 and place value counters, children should see part-whole models and bar models before moving on to formal column subtraction.

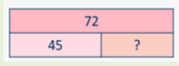


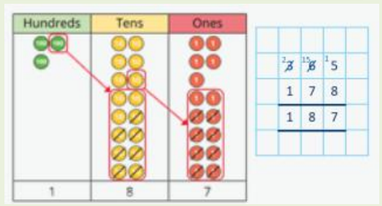


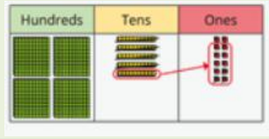
Subtract two numbers across a 10 or 100

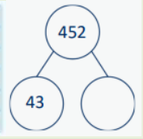
Formal written method involving up to 2 exchanges including 3-digit subtract 2-digit numbers. Children should continue to develop their missing number skills by exploring inverses.
I need to subtract … ones. I do/do not need to make an exchange.
I need to subtract ... tens. I do/do not need to make an exchange.
I can exchange 1 … for 10 …
Alongside exploring this practically with Base 10 and place value counters, children should see part-whole models and bar models before moving on to formal column subtraction.





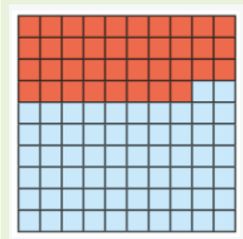


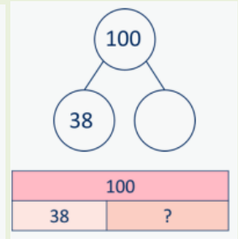




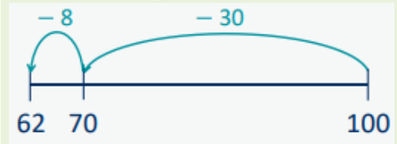
Complements to 100

Focus on subtraction facts.
Encourage children to notice patterns.
100 minus … is equal to …





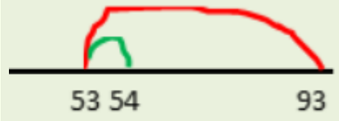
I subtract … tens, then I subtract … ones.



100 − 38 = 62
100 − 62 = 38
62 = 100 − 38
38 = 100 − 62
Children may choose to count on from the smallest number instead.
Reinforce fact families and inverse discussions from Year 2.

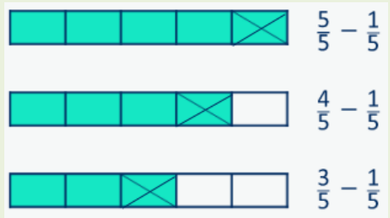
Special Cases

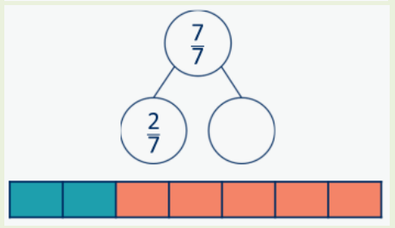
It is important to discuss cases when using column subtraction, may not be the most efficient method. In these cases, it may be more efficient for children to use mental methods or to draw their own number lines.
93 – 39 =
93 – 40 + 1 = 54



Subtract fractions with the same denominator within 1 whole

Make links with known facts.
When subtracting fractions with the same denominator, I only subtract the numerator.
… fifths − … fifths = … fifths





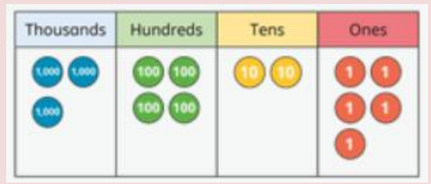
Key Vocabulary: subtract, subtraction, take (away), leave, minus, less than, how many are left/left over?, how many have gone?, one less, two less… ten less…, one hundred less…, how many fewer is… than…?, difference between, is the same as, numeral, partition, subitise, number, change, estimate, difference, leave, half, halve, how many are left/left over?, how many are gone?, how much less is…?, =, equals, sign, is the same as, count on, count back, difference between, how many more is…than..?, how much more is..?, leave, column, fact family, inverse, regroup, multiples of tens and hundreds, exchange, decrease, fractions, numerator, denominator, efficient
Mental Strategies: Subtract numbers mentally, including: Subtracting a single digit number from a 3-digit number Subtracting a multiple of 10 from a 3-digit number Subtracting a multiple of 10 from a 3-digit number Estimate the answer to a calculation and use inverse operations to check answer Using place value to partition and count on / add ones, tens and hundreds Use number lines to support visualisations

Year 4 - SUBTRACTION

- **Subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate.**
- **Estimate and use inverse operations to check answers to a calculation.**
- **Solve subtraction two-step problems in contexts, deciding which operations and methods to use and why.**
- **Solve simple measure and money problems involving fractions and decimals to 2 decimal places.**
- **Subtract fractions with the same denominator.**

Subtract 1s, 10s, 100s and 1,000s from a 4-digit number

Emphasis on mental strategies including number bonds and related facts.
Prompt children to notice which digit changes.
The ones/tens/hundreds/thousands
column will decrease by …



3,425 − 2 =
3,425 − 20 =
3,425 − 200 =
3,425 − 2,000 =

What patterns do you notice?

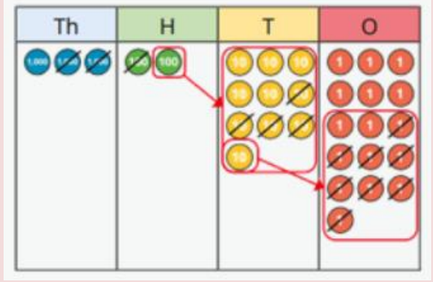
4,356 − 3 =
4,356 − 30 =
4,356 − 300 =
4,356 − 3,000 =

6,940 − 200 =
6,940 − 300 =
6,940 − 400 =

$4{,}433 - \square = 4{,}430$
$4{,}433 - \square = 4{,}033$
$4{,}433 - \square = 4{,}403$

Subtract up to two 4-digit numbers

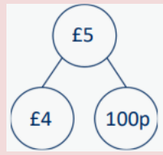
Formal written method with up to 3 exchanges. Encourage children to estimate and use inverse operations to check answers to calculations.
I need to subtract… ones/tens/hundreds. I do/do not need to make an exchange.
I can exchange 1… for 10…



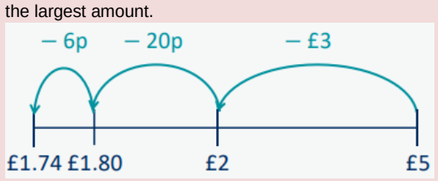
Subtract decimal numbers in the context of money

Emphasis here is on partitioning and use of number lines rather than formal written calculations.
I can partition £… into £… and 100p
£… − £… = £…
100p − …p = …p

£5 − £3.26
£4 − £3 = £1
100p − 26p = 74p
£5 - £3.26 = £1.74

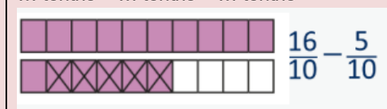


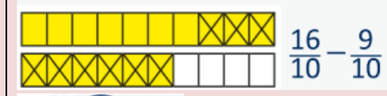
£3.26 can be partitioned into £3 + 20p + 6p
Children may choose to add on from the smallest amount or subtract from the largest amount.

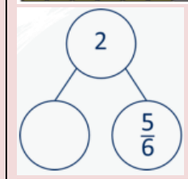


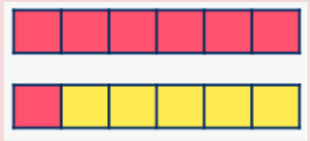
Subtract fractions and mixed numbers with the same denominator

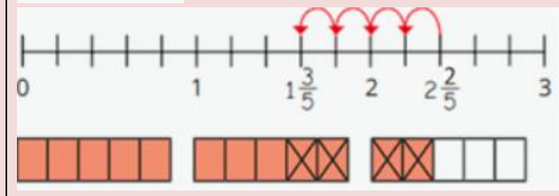
Include subtracting fractions from wholes.
When subtracting fractions with the same denominator,
I only subtract the numerator.
… tenths − … tenths = … tenths











Key Vocabulary:
subtract, subtraction, take (away), leave, minus, less than, how many are left/left over?, how many have gone?, one less, two less… ten less…, one hundred less…, how many fewer is… than…?, difference between, is the same as, numeral, partition, subitise, number, change, estimate, difference, leave, half, halve, how many are left/left over?, how many are gone?, how much less is…?, =, equals, sign, is the same as, count on, count back, difference between. how many more is…than..?, how much more is..?, leave, column, fact family, inverse, regroup, multiples of tens, hundreds and thousands, exchange, decrease, fractions, numerator, denominator, efficient, tenths and hundredths boundary, decimal, decimal point

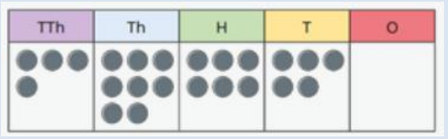
Mental Strategies:
Subtract numbers mentally, including:
Subtracting multiples of one thousand from a 4-digit number
Use of number pairs that total 1000 (multiples of 10) to calculate subtraction (e.g 1000 – 300 = 700)
Estimate the answer to a calculation and use inverse operations to check answers
Using place value to partition and count on / add ones, tens and hundreds
Use number lines to support visualisations

Year 5 - SUBTRACTION

- **Subtract numbers mentally with increasingly large numbers.**
- **Subtract whole numbers with more than 4 digits, including using formal written methods (columnar subtraction).**
- **Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.**
- **Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.**
- **Subtract decimals, including a mix of whole numbers and decimals, decimals with different numbers of decimal places, and complements of 1.**
- **Subtract fractions with the same denominator, and denominators that are multiples of the same number.**

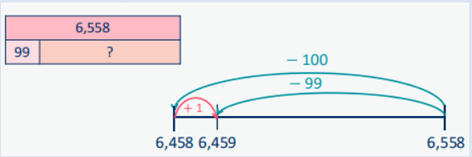
Subtract using mental strategies

Subtract 1s, 10s, 100s etc from any number.
Use number bonds and related facts.



48,650 − 300 =
48,650 − 30,000 =
48,650 − 30 =

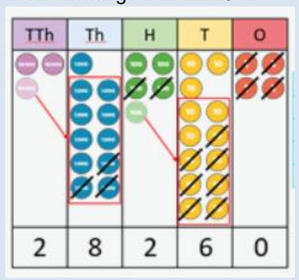
To subtract …, I can subtract … then add …

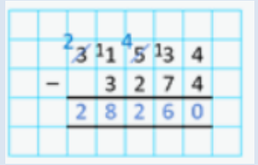


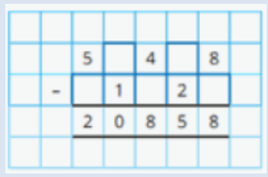
45678 – 3500 = 42178
45678 – 3000 = 42678
42678 – 500 = 42178

Subtract whole numbers with more than 4 digits

Encourage children to estimate and use inverse operations to check answers to calculations.
I can exchange 1 … for 10 …



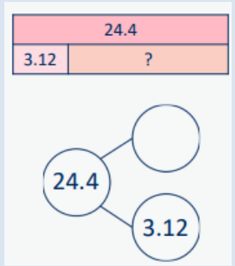




These questions build on missing number problems from previous years and ensure children have a secure understanding of exchanging.

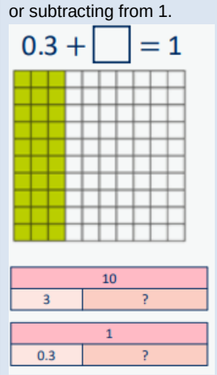
Subtract decimals with up to 2 decimal places

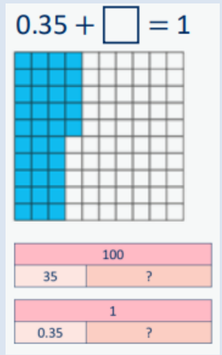
Progress from the same number of decimal places to a different number of decimal places and from no exchange to exchange. Discuss situations where mental strategies are more efficient than column subtraction.
6.76 – 0.06 = 6.7
7.47 – 0.4 = 7.07

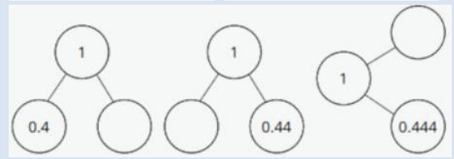


Complements to 1

Encourage children to make links with bonds to 10 and complements to 100 and 1,000 when finding a missing part or subtracting from 1.





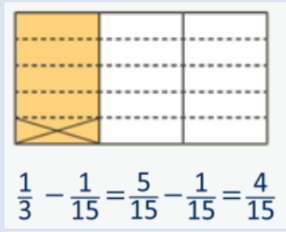


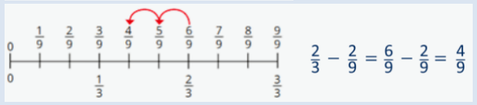
10 − 4 = 6
100 − 44 = 56
1,000 − 444 = 556

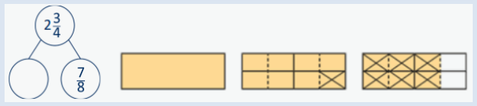
1 − 0.4 = 0.6
1 − 0.44 = 0.56
1 − 0.444 = 0.556

Subtract fractions with denominators that are a multiple of one another

Convert fractions to the same denominator before subtracting. Progress from subtracting fractions within 1 whole to subtracting from a mixed number.
The denominator has been multiplied by …, so the numerator needs to be multiplied by…
for the fractions to be equivalent.







Key Vocabulary:
subtract, subtraction, take (away), leave, minus, less than, how many are left/left over?, how many have gone?, one less, two less… ten less…, one hundred less…, how many fewer is… than…?, difference between, is the same as, numeral, partition, subitise, number, change, estimate, difference, leave, half, halve, how many are left/left over?, how many are gone?, how much less is…?, =, equals, sign, is the same as, equivalent, count on, count back, difference between, how many more is…than..?, how much more is..?, leave, column, fact family, inverse, regroup, multiples of tens and hundreds, exchange, decrease, fractions, numerator, denominator, mixed number, efficient, tenths, hundredths and thousandths boundary

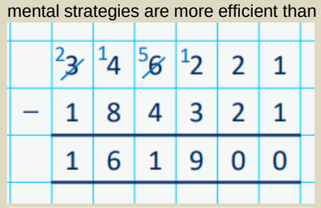
Mental Strategies:
Subtract increasingly large numbers mentally (e.g 12, 654 – 1,341 = 11, 213)
Mentally subtract tenths (e.g 0.7 - 0.5 = 0.2) and 1-digit whole numbers and tenths (8 - 0.3 = 7.7)
Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
Using place value to partition and count on, including decimals
Using estimating and rounding strategies

Year 6 - SUBTRACTION

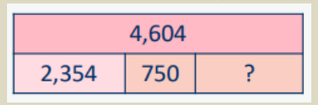
- **Perform mental calculations, including with mixed operations and large numbers.**
- **Subtract larger numbers, using the formal written methods of columnar subtraction.**
- **Use their knowledge of the order of operations to carry out calculations involving the four operations.**
- **Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.**
- **Calculate intervals across zero.**
- **Subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.**

Subtract integers up to 10 million

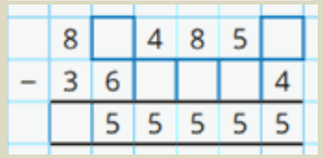
Encourage children to estimate and use inverse operations to check answers to calculations. Discuss situations where mental strategies are more efficient than column subtraction.



	$^{2}\cancel{3}$	$^{1}4$	$^{5}\cancel{6}$	$^{1}2$	2	1
−	1	8	4	3	2	1
	1	6	1	9	0	0



4,604		
2,354	750	?

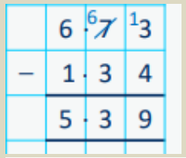


	8		4	8	5	
−	3	6				4
		5	5	5	5	5

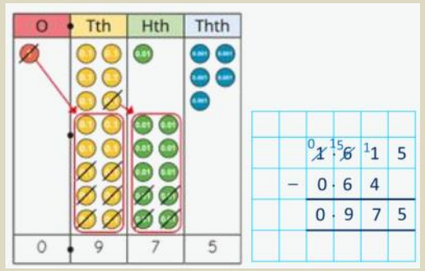
Subtract decimals with up to 3 decimal places

Progress from the same number of decimal and whole number places to a different number of decimal and whole number places. Discuss situations where mental strategies are more efficient than column subtraction.

I do/do not need to make an exchange because ...



	6	$^{6}\cancel{7}$	$^{1}3$
−	1	3	4
	5	3	9

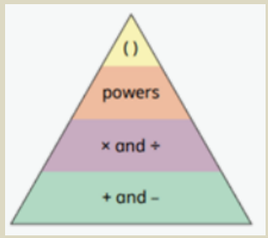


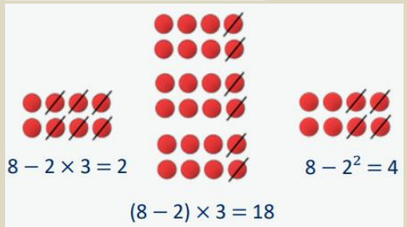
Children are expected to always include 0 as a place holder.

Order of operations

Children learn the order of priority for operations in a calculation. Calculations in brackets should be done first. Multiplication and division should be performed before addition and subtraction.

... has greater priority than …, so the first part of the calculation I need to do is …



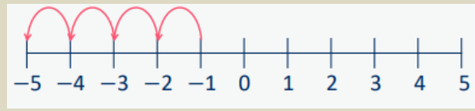


Negative numbers

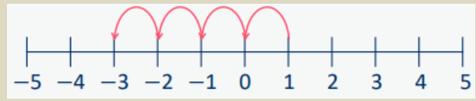
Children subtract from positive and negative numbers and calculate intervals across 0.

… minus … is equal to …

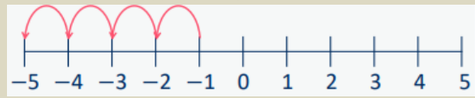
−1 − 4 = −5



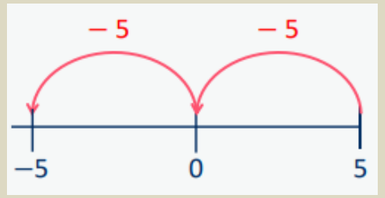
1 − 4 = −3



The difference between – 5 and −1 is 4



The difference between 5 and −5 is 10

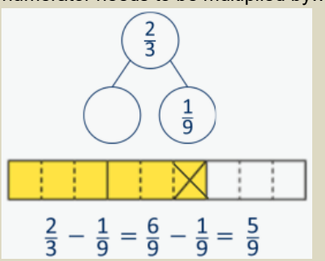


Children are expected to draw their own number lines as an aid.

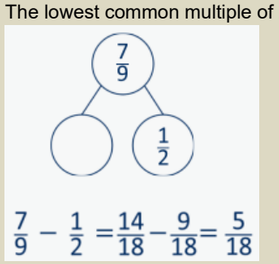
Subtract fractions

Convert fractions to the same denominator before subtracting. Progress from fractions where one denominator is a multiple of the other, to any fractions and then subtracting from a mixed number.

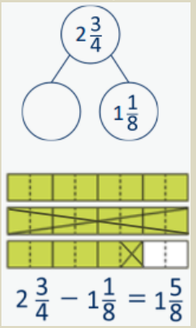
The denominator has been multiplied by …, so the numerator needs to be multiplied by…



The lowest common multiple of … and … is ...



… is made up of … wholes and …



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Mental Strategies:

Subtract increasingly large numbers mentally (e.g 12, 654 – 1,341 = 11, 213)

Subtract decimal numbers mentally (up to 2 decimal places)

Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.

Reception - MULTIPLICATION

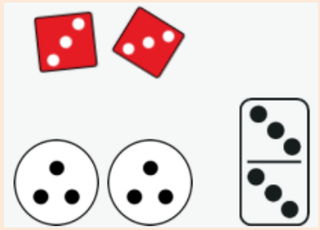
- **Solve problems, including doubling to 10.**
- **Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.**

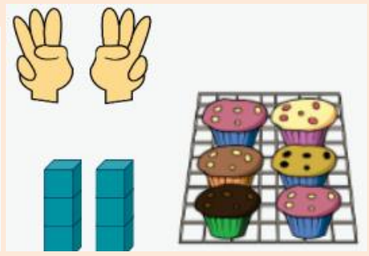
Double to 10

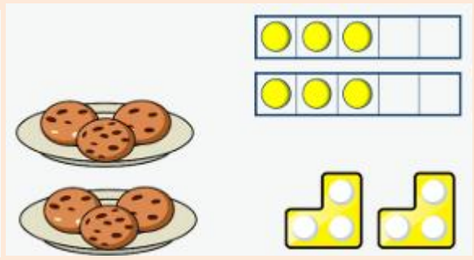
Prompt children to notice that double means twice as many and to notice that there are two equal groups.

Double … is …

… is double …







Make equal groups

Provide opportunities to make equal groups when tidying up or during snack time. Encourage children to check that each group has the same amount.

There are … groups of …

There are … altogether.

How many groups of 2 are there? 2 + 2 + 2 + 2 + 2, so 5 groups of 2

Use 'real' life contexts and use of practical equipment to count in repeated groups of the same size

Key Vocabulary:
Group, lots of, double

Mental Strategies:
Develop a mental image of the number system
Understand the value of a number
Counting in 2s, 5s and 10s
Number patterns on a number line and on a hundred square – 2's, 5's and 10's.

Year 1 - MULTIPLICATION

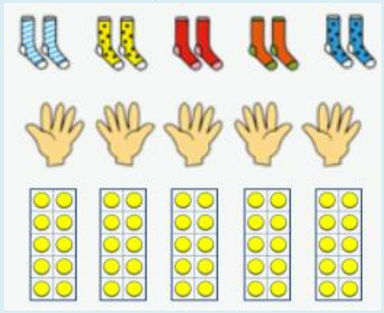
- **Count in multiples of twos, fives and tens.**
- **Solve one-step problems involving multiplication, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.**

Count in 2s, 5s and 10s

Begin by counting objects that naturally come in 2s, 5s and 10s, for example pairs of socks or fingers.

There are … equal groups of …

There are … altogether

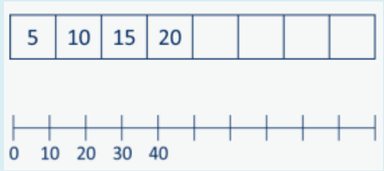


Continue to colour in ...s

What do you notice?

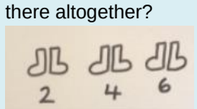
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

Complete the number track/number line by counting in …s.



Children will be given one-step word problems to solve, involving counting in multiples of 2, 5 and 10 and doubles. Children will use concrete objects and pictorial representations to support their ideas.

Alfie, Joseph and Ben all have a pair of socks. How many socks are there altogether?

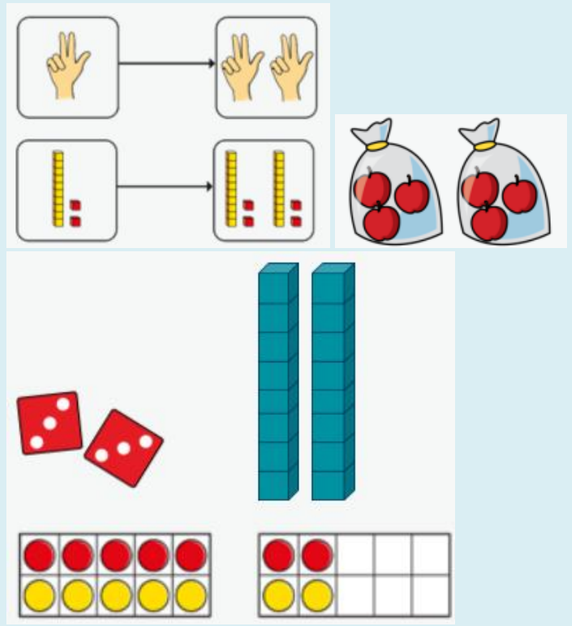


Make doubles

Children understand that doubles are two equal groups. Children may begin to explore doubles beyond 20 using base 10.

Double … is …

… + … = …



Add equal groups (repeated addition)

Children should be able to write a repeated addition to represent equal groups and to draw pictures or use objects to represent a repeated addition.

There are … groups of …

There are … altogether

10 + 10 + 10 = 30

3 x 10 = 30

Begin to introduce the multiplication sign (x).

5 + 5 + 5 + 5 = 20

4 x 5 = 20

What is the same? What is different?

2 + 2 + 2 =

5 + 5 + 5 =

10 + 10 + 10 =

Use objects or a drawing to represent the equal groups and find how many in total.

There are two apples on one plate.

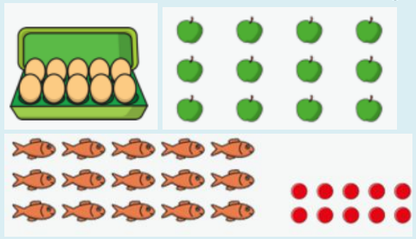
How many apples on 3 plates?

Make arrays

Children use their knowledge of adding equal groups to arrange objects in columns and rows.

There are … rows of … There are … altogether.

There are … columns of … There are … altogether.



Key Vocabulary:

Groups of, lots of, times, array, altogether, multiply, count, multiplication, sets of, double, odd, even, count in twos, fives, count in tens (forwards from/backwards from), how many times?, once, twice, five times, ten times , multiple of, times, multiply by, row, column, double, repeated addition

Mental Strategies:

Make Equal Groups e.g. Can you make the cubes into towers of 2? Put the teddy bears into groups of 3

Children count repeated groups of the same size in practical contexts to understand multiplication as repeated addition

Children count in 2s, 5s and 10s, using a variety of concrete resources and contexts

Doubling - Use concrete and pictorial representations to calculate doubles up to and including 10

Count forwards and backwards in multiples of 2s, 5s and 10s

Year 2 - MULTIPLICATION

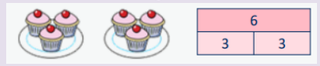
- **Count in steps of 2, 3, 5, 11 from 0, and in tens from any number, forward or backward.**
- **Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.**
- **Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.**
- **Calculate mathematical statements for multiplication within the multiplication tables and write them using the multiplication (×) and equals (=) signs.**
- **Solve problems involving multiplication using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.**

Link repeated addition and multiplication

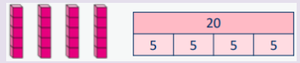
Encourage children to make the link between repeated addition and multiplication.

There are … equal groups with … in each group.

There are … altogether.



3 + 3 = 6
2 × 3 = 6



5 + 5 + 5 + 5 = 20
4 × 5 = 20

Use arrays

Encourage children to see that multiplication is commutative.

There are … rows with … in each row.

There are … columns with … in each column.

3 lots of 5 = 15
5 + 5 + 5 = 15
5 lots of 3 = 15
3 + 3 + 3 + 3 + 3 = 15

I can see … × … and … ×…

3 × 5 = 15
5 × 3 = 15
3 × 5 = 5 × 3

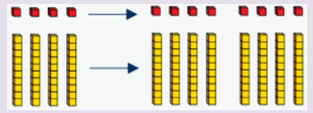
Double

Encourage children to make links with related facts.

Double … is …

Double 4 = 4 + 4
Double 4 is 8

Double … is … so double … is ...



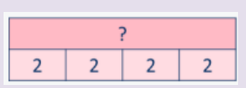
Double 4 is 8
Double 40 is 80

The 2 times-table

Encourage daily counting in multiples both forwards and back. Notice that all multiples of 2 are even numbers.

… lots of 2 =

… × 2 =



… times 2 is equal to …

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

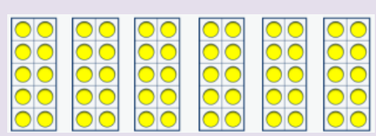
1 × 2 = 2 2 = 1 × 2
2 × 2 = 4 4 = 2 × 2
3 × 2 = 6 6 = 3 × 2

The 10 times-table

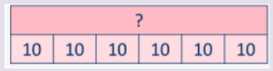
Encourage daily counting in multiples both forwards and back. Notice the pattern in the numbers.

… lots of 10 =

… × 10 =



… times 10 is equal to …



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

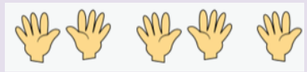
1 × 10 = 10 10 = 1 × 10
2 × 10 = 20 20 = 2 × 10
3 × 10 = 30 30 = 3 × 10

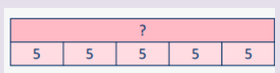
The 5 times-table

Encourage daily counting in multiples both forwards and back. Notice the pattern in the numbers.

… lots of =

… × 5 =

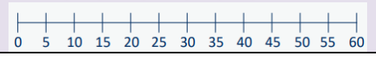




… times is equal to …

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

1 × 5 = 5 5 = 1 × 5
2 × 5 = 10 10 = 2 × 5
3 × 5 = 15 15 = 3 × 5

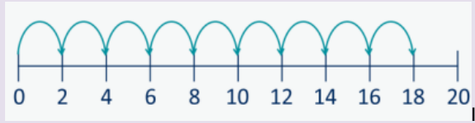


Problems and missing numbers

Make links to known facts.

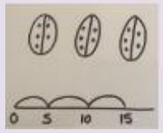
… is equal to … groups of …

18 socks, how many pairs?



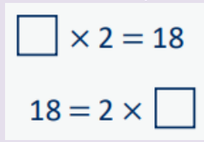
I have 3 ladybirds with 5 spots each.

How many spots do they have altogether?



5 + 5 + 5 = 15
3 x 5 = 15

… times … is equal to …



Key Vocabulary: Groups of, lots of, times, array, altogether, multiply, count, multiplication, sets of, double, odd, even, count in twos, fives, count in tens (forwards from/backwards from), how many times?, once, twice, five times, ten times , multiple of, times, multiply by, row, column, double, repeated addition, commutative, tens, ones, value, product
Mental Strategies: Count forwards and backwards in multiples of 2, 5, 10 and 3's Use arrays to support multiplication Repeated Addition Know the 2, 5 and 10 times tables (in and out of order) Recognise odd and even numbers

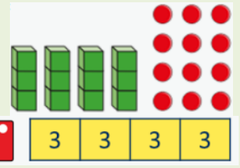
Year 3 - MULTIPLICATION

- **Count in multiples of 4, 6, 7, 8, 9, 12, 50 from 0, and in hundreds from any number, forward or backward.**
- **Recall and use multiplication facts for the 3, 4 and 8 multiplication tables.**
- **Write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.**
- **Solve problems, including missing number problems, involving multiplication including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.**
- **Estimate the answer to a calculation and use inverse operations to check answers.**

The 3 times-table

Encourage daily counting in multiples both forwards and back.

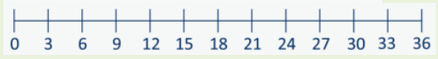
… groups of =
… × 3 =
… times =
3 × … =



… times is equal to …

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

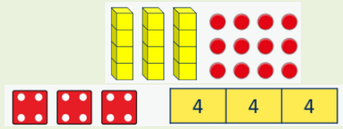
4 × 3 = 12
12 = 4 × 3



The 4 times-table

Encourage daily counting in multiples both forwards and back. Encourage children to notice links between the 2 and 4 times-tables.

… groups of =
… × 4 =
… times =
4 × … =



… times is equal to …

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

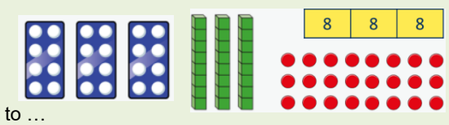
3 × 4 = 12
12 = 3 × 4

Cards come in packs of 4. How many packs do I need to buy to get 32 cards?

The 8 times-table

Encourage daily counting in multiples both forwards and back. Encourage children to notice links between the 2, 4 and 8 times-tables.

… lots of 8 =
… × 8 =
… times 8 =
8 × … =



… times is equal to …

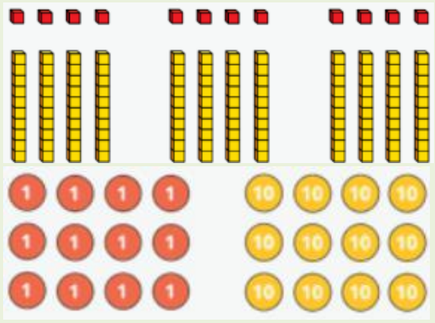
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30

3 × 8 = 24
24 = 3 × 8

24 = □x□
Which pairs of numbers could be written in the boxes?

Multiplying by 10

Use knowledge of multiplying by 10 to scale times-table facts.
… × … ones is equal to … ones
so … × … tens is equal to … tens.

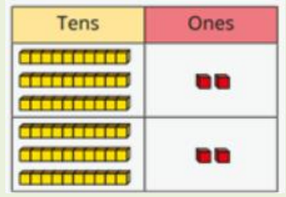


3 × 4 = 12
3 × 40 = 120

2 x 3 = 6
20 x 3 = 60.
Use this fact to work out
21 x 3 =
22 x 3 =
23 x 3 =
24 x 3 =

Multiply a 2-digit number by a 1-digit number - no exchange

Children apply their understanding of partitioning to represent and solve calculations using the expanded method.
… tens multiplied by … is equal to … tens.
…ones multiplied by … is equal to … ones.



30 × 2 = 60
2 × 2 = 4
32 × 2 = 64

21 x 4 =
80 + 4 = 84

x	20	1
4	80	4

Multiply a 2-digit number by a 1-digit number - with exchange

Children apply their understanding of partitioning to represent and solve calculations using the expanded method.
… tens multiplied by … is equal to … tens.
… ones multiplied by … is equal to … ones.

20 × 4 = 80
4 × 4 = 16
24 × 4 = 96

24 x 4 =
80 + 16 = 96

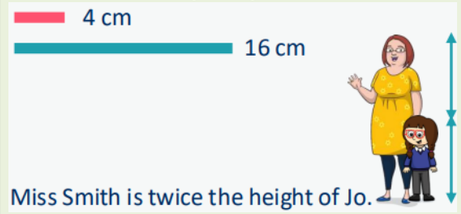
x	20	4
4	80	16

Scaling

Children focus on multiplication as scaling (…. times the size) as opposed to repeated addition.
There are …. times as many … as …

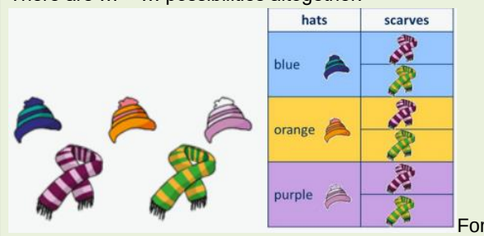
There are 3 times as many triangles as circles.

… is … times the size of …
… is … times the length/height of …



Correspondence problems (How many ways?)

Encourage children to work systematically to find all the different possible combinations.
For every … , there are … possible ...
There are … × … possibilities altogether.



For every hat, there are two possible scarves.
3 × 2 = 6
There are 6 possibilities altogether.

Key Vocabulary: Groups of, lots of, times, array, altogether, multiply, count, multiplication, sets of, double, odd, even, count in twos, fives, count in tens (forwards from/backwards from), how many times?, once, twice, five times, ten times, multiple of, times, multiply by, row, column, double, repeated addition, commutative, tens, ones, value, product, grid method, partition, scaling, correspondence
Mental Strategies: Count forwards and backwards in multiples of 4, 8, 50 & 100 Know the 3, 4 and 8 times tables (in and out of order) Connect the 2, 4 and 8 times tables through doubling Double numbers to 50 by partitioning into tens and ones, doubling and recombining e.g. to double 26, first partition into 20 and 6, Use known facts Use knowledge of place value to calculate multiplication (e.g. 2 x 2 = 4, 2 x 20 = 40, 2 x 200 = 400)

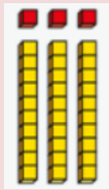
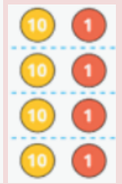
Year 4 - MULTIPLICATION

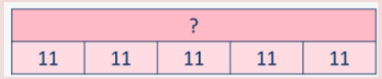
- **Count in multiples of 25 and 1 000.**
- **Recall multiplication facts for multiplication tables up to 12 × 12.**
- **Use place value, known and derived facts to multiply mentally, including multiplying by 0 and 1; multiplying together three numbers.**
- **Recognise and use factor pairs and commutativity in mental calculations.**
- **Multiply two-digit and three-digit numbers by a one-digit number using formal written layout.**
- **Estimate and use inverse operations to check answers to a calculation.**
- **Solve problems, including missing number problems, involving multiplication including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.**

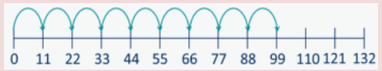
Times-table facts to 12 × 12

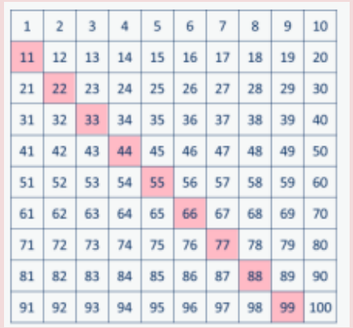
Encourage daily counting in multiples both forwards and back. Encourage children to notice links between related times-tables.

… groups of … =
… times … is equal to …
… × … =

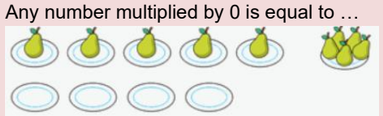






Multiply by 1 and 0

Any number multiplied by 1 is equal to …
Any number multiplied by 0 is equal to …



… × … = …
1 × 1 = 1
2 × 1 = 2
3 × 1 = 3
4 × 1 = 4

1 × 0 = 0
2 × 0 = 0
3 × 0 = 0
4 × 0 = 0

Multiply 3 numbers

Children use their understanding of commutativity to multiply more efficiently.

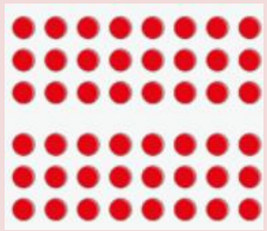
To work out … × … × …, I can first calculate … × … and then multiply the answer by …

4 × 2 × 3 = 8 × 3 = 24
2 × 3 × 4 = 6 × 4 = 24
3 × 4 × 2 = 12 × 2 = 24

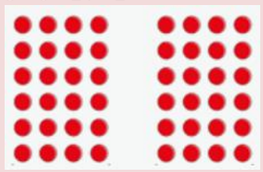
Factor Pairs

Children explore equivalent calculations using different factors pairs.

12 = … × … , so … × 12 = …× … × …



8 × 6 = 8 × 3 × 2
8 × 6 = 24 × 2



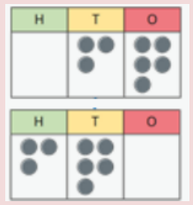
6 × 8 = 6 × 4 × 2
6 × 8 = 24 × 2

Multiply by 10 and 100

Some children may overgeneralise that multiplying by 10 or 100 always results in adding zeros. This will cause issues later when multiplying decimals.

When I multiply by 10, the digits move … place value column to the left.

… is 10 times the size of …



35 × 10 = 350

When I multiply by 100, the digits move … place value columns to the left.

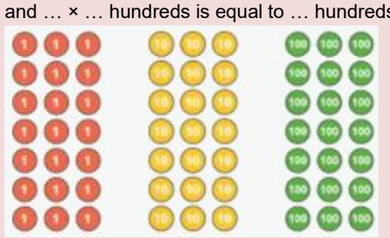
… is 100 times the size of …

14 × 100 = 1,400

Related facts

Use knowledge of multiplying by 10 and 100 to scale times-table facts.

… × … ones is equal to … ones
so … × … tens is equal to … tens
and … × … hundreds is equal to … hundreds.



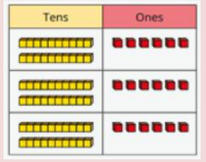
3 × 7 = 21
3 × 70 = 210
3 × 700 = 2,100

7 × 3 = 21
7 × 30 = 210
7 × 300 = 2,100

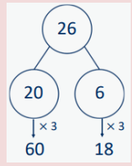
Mental Strategies

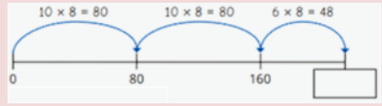
Partition 2 or 3-digit numbers to multiply using informal methods.

… tens multiplied by … is equal to … tens.
…ones multiplied by … is equal to … ones.



3 × 26 = 60 + 18 = 78





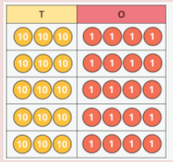
26 × 8 = 80 + 80 + 48 = 208

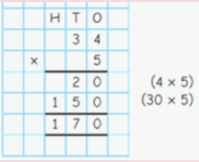
Multiply a 2 or 3-digit number by a 1-digit number

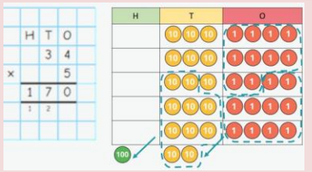
The short multiplication method is introduced for the first time, initially in an expanded form.

To multiply a 2-digit number by … , I multiply the ones by … and the tens by …

To multiply a 3-digit number by … , I multiply the ones by … , the tens by … and the hundreds by …

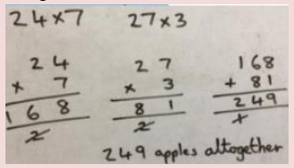






Use short multiplication to solve problems

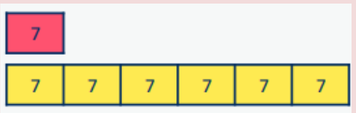
Harriet has 7 friends who each have 24 apples.
Joseph has 3 friends who each have 27 apples. How many apples do Harriet and Joseph's friends have altogether?



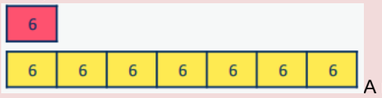
Scaling

Children focus on multiplication as scaling (… times the size).

… is … times the size of …



A computer mouse costs £7
A keyboard costs 6 times as much.



A red ribbon is 6 cm.
A yellow ribbon is 7 times as long.

Correspondence problems

Encourage children to use tables to show all the different possible combinations.

For every … , there are … possibilities.
There are … × … possibilities altogether.
A pizza company offers a choice of 5 toppings and 3 bases.

	Deep pan	Italian	Thin
Cheese	C DP	C I	C Th
Mushroom	M DP	M I	M Th
Vegetable	V DP	V I	V Th
Chicken	C DP	C I	C Th
Tuna	T DP	T I	T Th

5 × 3 = 15

Key Vocabulary: Groups of, lots of, times, array, altogether, multiply, count, multiplication, sets of, double, odd, even, count in twos, fives, count in tens (forwards from/backwards from), how many times?, once, twice, five times, ten times , multiple of, times, multiply by, row, column, double, repeated addition, commutative, tens, ones, value, multiples, product, factors, grid method, short multiplication, partition, scaling, correspondence, efficient
Mental Strategies: Use concrete resources to illustrate commutativity and factor pairs Count in steps of 6, 7, 9, 25 and 1000 Use number facts Use place value knowledge Know all times tables up to and including 12 x 12 (by the end of Year 4) Recognise and use factor pairs (e.g factor pairs for numbers up to and including 10) Know that TO x 5 is TO x 10 then divide by 2 (e.g 18 x 5 = (18 x 10) ÷ 2 = 90) Know that TO x 9 is TO x 10 then subtract TO (e.g 18 x 9 = (18 x 10) – 18 = 162)

Year 5 - MULTIPLICATION

- **Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000.**
- **Multiply numbers mentally drawing upon known facts.**
- **Multiply whole numbers and those involving decimals by 10, 100 and 1000.**
- **Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers.**
- **Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.**
- **Know and use the vocabulary of prime numbers, prime factors and composite (nonprime) numbers.**
- **Establish whether a number up to 100 is prime and recall prime numbers up to 19.**
- **Recognise and use square numbers and cube numbers, and the notation for squared and cubed.**
- **Solve problems involving multiplication including using their knowledge of factors and multiples, squares and cubes.**
- **Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign.**
- **Solve problems involving multiplication, including scaling by simple fractions and problems involving simple rates.**
- **Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.**

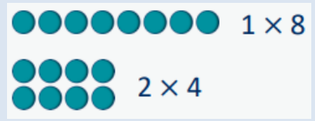
Multiples and factors

Encourage children to notice patterns and make links with known facts.

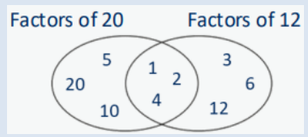
… is a multiple of … because
… × … = …

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

… is a factor of … because
… × … = …

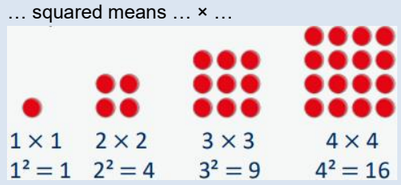


1, 2, 4 and 8 are factors of 8
The common factors of … and … are …

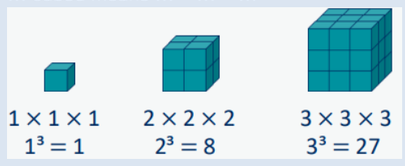


Square and cube numbers

… squared means … × …



… cubed means … × … × …

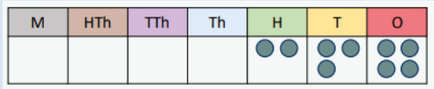


Multiply by 10, 100 and 1,000

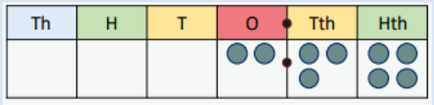
Some children may overgeneralise that multiplying by a power of 10 always results in adding zeros. This will cause issues later when multiplying decimals.

To multiply by 10/100/1,000, I move all the digits … places to the left.
… is 10/100/1,000 times the size of …

234 × 10 = 2,340
234 × 100 = 23,400
234 × 1,000 = 234,000



2.34 × 10 = 23.4
2.34 × 100 = 234
2.34 × 1,000 = 2,340



Mental strategies

Children continue to use efficient mental strategies such as partitioning and knowledge of factor pairs and related facts to multiply.

The most efficient strategy to calculate … × … is …
To calculate … × 12, I can do … × … × …

121 × 12
I could calculate 100 × 12 plus 20 × 12 plus 1 × 12
I could calculate 121 × 10 plus 121 × 2
I could calculate 121 × 6 × 2
I could calculate 121 × 4 × 3

£3.99 × 6
£4 × 6 = £24
£24.00 – £0.06 = £23.94

28 × 19
28 x 20 – 28
28 × 10 × 2 = 560
560 – 28 = 532

Multiply numbers up to 4 digits by a 1-digit number

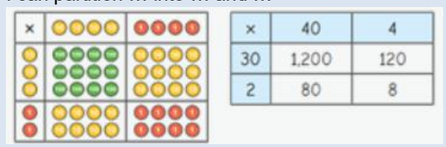
This builds on the short multiplication method introduced in Y4.

To multiply a 4-digit number by … , I multiply the ones by … , the tens by … , the hundreds by … and the thousands by …

Multiply numbers up to 4 digits by a 2-digit number

Numbers are first partitioned using an area model then long multiplication is introduced for the first time.

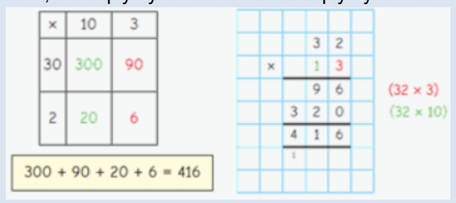
I can partition … into … and …



×	40	4
30	1,200	120
2	80	8

32 × 44 = 1,200 + 80 + 120 + 8
32 × 44 = 1,408

First, I multiply by the … Then I multiply by the ...



×	10	3
30	300	90
2	20	6

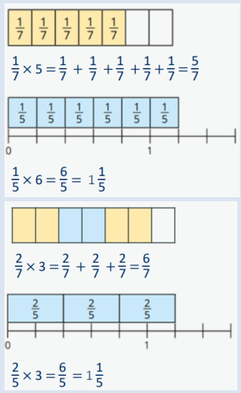
300 + 90 + 20 + 6 = 416

3 2
× 1 3
9 6
3 2 0
4 1 6
(32 × 3)
(32 × 10)

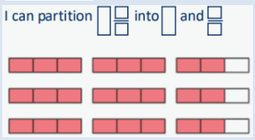
Multiply fractions by a whole number

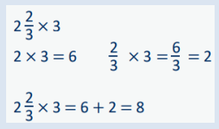
Make links with repeated addition.

To multiply a fraction by an integer, I multiply the numerator by the integer, and the denominator remains the same.



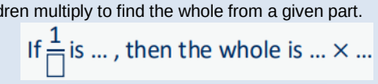
Multiply mixed numbers by a whole number

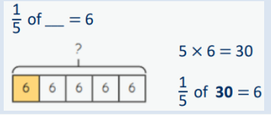


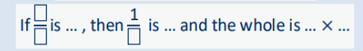


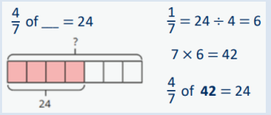
Find the whole

Children multiply to find the whole from a given part.









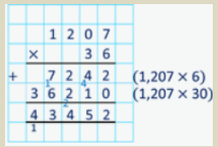
Key Vocabulary: Groups of , lots of, times, array, altogether, multiply, count, multiplication, sets of, double, odd, even, count in twos, fives, count in tens (forwards from/backwards from), how many times?, once, twice, five times, ten times , multiple of, times, multiply by, row, column, double, repeated addition, commutative, tens, ones, value, multiples, product, factors, grid method, short multiplication, square number, cube number, prime number, composite number, partition, correspondence, scaling, efficient, decimal place, tenths and hundredths, integer
Mental Strategies: Recognise and calculate factor pairs for any number Use times table knowledge to derive multiples of any number Establish whether a number is a prime number (up to 100) or a composite number (not prime) and recall prime numbers up to 19 To know what a square number is and recall all square numbers (up to and including 144) To know what a cube number is and recall the first 5 cube numbers Near multiples

Year 6 - MULTIPLICATION

- **Perform mental calculations, including with mixed operations and large numbers.**
- **Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication.**
- **Multiply numbers by 10, 100 and 1,000.**
- **Multiply one-digit numbers with up to two decimal places by whole numbers.**
- **Identify common factors, common multiples and prime numbers use common factors to simplify fractions.**
- **Use common multiples to express fractions in the same denomination.**
- **Calculate, estimate and compare volume of cubes and cuboids using standard units, including centimetre cubed (cm ^{3}) and cubic metres (m ^{3}), and extending to other units such as mm ^{3} and km ^{3} .**
- **Use their knowledge of the order of operations to carry out calculations involving the four operations.**
- **Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.**
- **Solve problems involving addition, subtraction, multiplication and division.**
- **Solve problems involving similar shapes where the scale factor is known or can be found.**
- **Multiply simple pairs of proper fractions, writing the answer in its simplest form.**
- **Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts.**
- **Solve problems involving the calculation of percentages.**

Multiply numbers up to 4 digits by a 2-digit number

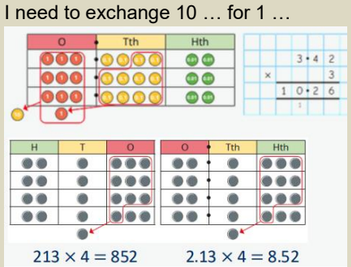
To multiply by a 2-digit number, first multiply by the ones, then multiply by the tens and then find the total.



Multiply decimals by integers

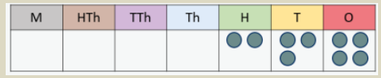
This is the first time children multiply decimals by numbers other than 10, 100 or 1,000
Encourage them to make links with known facts and whole number multiplication.
I know that …× … = …, so I also know that …× … = …

I need to exchange 10 … for 1 …

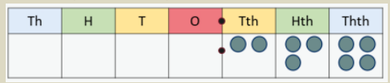


Multiply by 10, 100 and 1,000

Some children may overgeneralise that multiplying by a power of 10 always results in adding zeros.
To multiply by 10/100/1,000, I move all the digits … places to the left.
… is 10/100/1,000 times the size of …



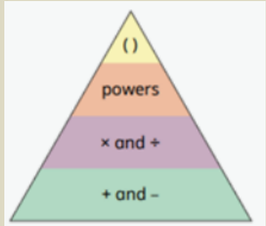
234 × 10 = 2,340
234 × 100 = 23,400
234 × 1,000 = 234,000

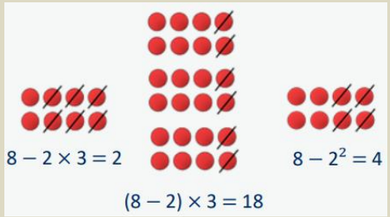


0.234 × 10 = 2.34
0.234 × 100 = 23.4
0.234 × 1,000 = 234

Order of Operations

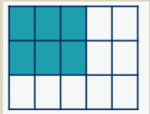
Calculations in brackets should be done first. Multiplication and division should be performed before addition and subtraction.
… has greater priority than …, so the first part of the calculation I need to do is …



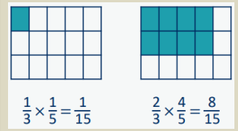


Multiply fractions by fractions

Encourage children to give answers in their simplest form.
When multiplying a pair of fractions, I need to multiply the numerator and multiply the denominator.



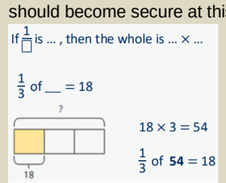
$\frac{2}{3} \times \frac{3}{5} = \frac{6}{15} = \frac{2}{5}$

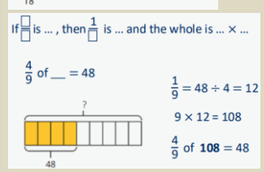


$\frac{1}{3} \times \frac{1}{5} = \frac{1}{15}$ $\frac{2}{3} \times \frac{4}{5} = \frac{8}{15}$

Find the whole

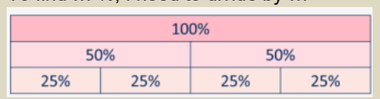
Children multiply to find the whole from a given part. This is introduced in Year 5 but children should become secure at this stage.





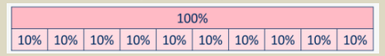
Calculate percentages

Children first learn how to find 1%, 10%, 20%, 25% and 50% before using multiples of these amounts to find any percentage.
There are … lots of … % in 100%
To find … %, I need to divide by …



0% of … = …÷ 2
2 % of … = …÷ 4

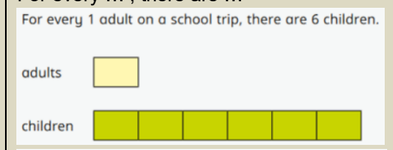
… % is made up of … %, and … %

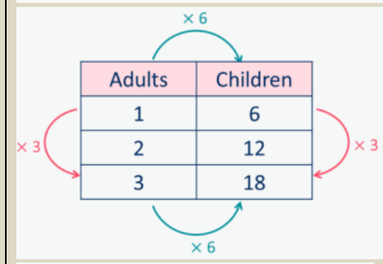


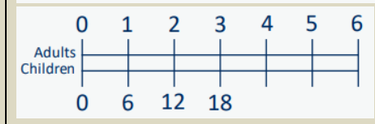
To find 30%, I can find 10% and then multiply it by 3
To find 23%, I can use 10% × 2 and 1% × 3
To find 99%, I can find 1%, then subtract from 100%

Calculations involving ratio

Encourage children to see the multiplicative relationship between ratios. They will need to multiply or divide each value by the same number to keep the ratio equivalent. Double number lines and ratio tables help children to see both horizontal and vertical multiplicative relationships.
For every … , there are …







The ratio of adults to children is 1 : 6

Key Vocabulary:
Groups of, lots of, times, array, altogether, multiply, count, multiplication, sets of, double, odd, even, count in twos, fives, count in tens (forwards from/backwards from), how many times?, once, twice, five times, ten times, multiple of, times, multiply by, row, column, double, repeated addition, commutative, tens, ones, value, multiples, product, factors, grid method, short multiplication, square number, cube number, prime number, composite number, partition, correspondence, scaling, efficient, decimal place, tenths and hundredths, integer, percentage, ratios, multiplicative, equivalent

Mental Strategies:
Use scaling to solve decimal number problems as whole number problems using the rule: 'the number of decimal digits in the question is the same as the number of decimal digits in the answer'
Identify common factors, common multiples and prime numbers
Use common factors to simplify fractions mentally
Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy

Reception - DIVISION

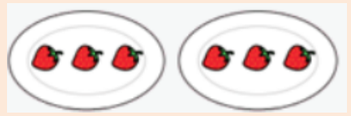
- **Have a deep understanding of number to 10, including the composition of each number.**
- **Subitise (recognise quantities without counting) up to 5.**
- **Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 and some number bonds to 10, including double facts.**
- **Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.**
- **Solve problems, including halving and sharing.**

Sharing

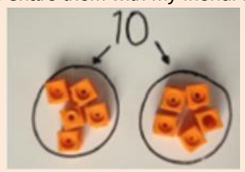
Provide practical activities such as sharing items during snack time. Encourage children to check whether items have been shared fairly (equally) by counting.

There are … altogether.

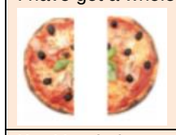
They are shared equally between … groups.



I have ten sweets. I want to share them with my friend. How many will we each have?



I have got a whole pizza to share between two people. Can you cut the pizza in half?



Grouping

Provide opportunities to make equal groups when tidying up or during snack time. Encourage children to check that each group has the same amount.

There are … groups of …

There are … altogether.

Key Vocabulary:

Halve, half, share, share equally, one each, two each…, group, in pairs, threes, equal groups of, divide, divided by, divided into, left over, whole

Mental Strategies:

Develop a mental image of the number system.

Understand the value of a number

Use of models and images - concrete objects/pictorial representations

Year 1 - DIVISION

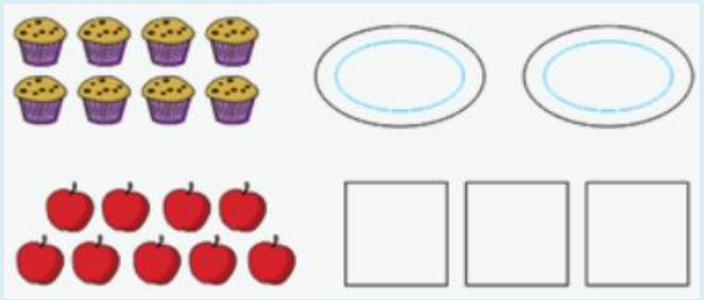
- **Solve one-step problems involving division by calculating the answer, using concrete objects, pictorial representations and arrays with the support of the teacher.**
- **Recognise, find and name a half as one of two equal parts of a quantity.**
- **Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.**

Make equal groups – sharing

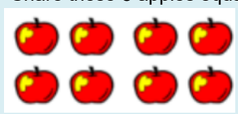
Encourage children to check that the objects have been shared fairly and each group is the same. There must be sufficient opportunities to manipulate practical resources, in order to support the learning of the difference between the concepts (grouping and sharing).

… have been shared equally between…

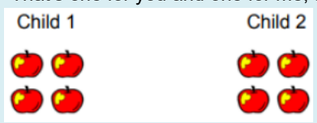
There are … on/in each …



“Share these 8 apples equally between 2 children. How many apples will each child have?”



“That’s one for you and one for me; another one for you and another one for me..” etc.



Each child has 4 apples [use of the word ‘fair’ supports understanding of equal]

“Share 20 crayons between 2 pots equally. How many crayons in each pot?”

Take … cubes.

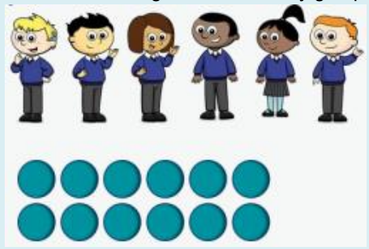
Share them between …

12 shared between … is …

Make equal groups – grouping

Encourage children to physically move objects into equal groups. They can also circle equal groups when using pictures. There must be sufficient opportunities to manipulate practical resources, in order to support the learning of the difference between the concepts (grouping and sharing).

There are … altogether. How many groups of … can you make?



“Put 20 crayons into groups of 10. How many pots do we need?”

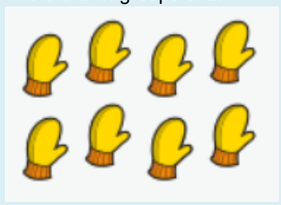
Take … cubes.

Make equal groups.

There are … groups of …

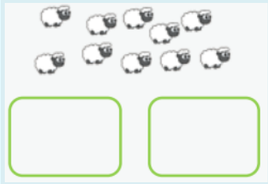
Circle groups of 2.

There are … groups of 2.

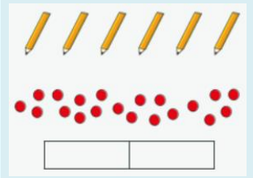


Find a half

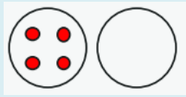
Start with practical opportunities to share a quantity into 2 groups. Progress to circling half of the objects in a picture and then to finding the whole from a given half.



To find half, I need to share into 2 equal groups.



There are … in each group.
Half of … is …

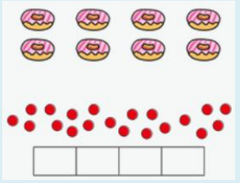


If … is half, what is the whole?
4 is half of …

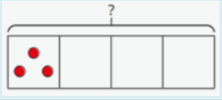
Find a quarter

Start with practical opportunities to share a quantity into 4 groups. Progress to using pictures or bar models to find a quarter and then to finding the whole from a given quarter.

To find a quarter, I need to share into 4 equal groups.



There are … in each group.
A quarter of … is …



If … is one quarter, what is the whole?

3 is one quarter of …

Key Vocabulary:

Halve, half, share, share equally, one each, two each…, group, in pairs, threes, equal groups of, divide, divided by, divided into, left over, estimate, fraction, whole, quarter, is the same as, is equal to, array

Mental Strategies:

Count forwards and backwards in multiples of 2s, 5s and 10s.
Children will start with practical sharing, using a variety of resources.
They will share objects into equal groups, in a variety of situations.
They will begin to use the vocabulary associated with division in practical contexts.

Year 2 - DIVISION

- **Count in steps of 2, 3, 5 and 11 from 0, and in tens from any number, forward or backward.**
- **Recall and use division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.**
- **Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.**
- **Calculate mathematical statements for division within the multiplication tables and write them using the division (÷) and equals (=) signs.**
- **Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.**
- **Recognise, find, name and write fractions 1 third, 1 quarter, 2 quarters and 3 quarters of a quantity.**

Sharing and Grouping

Continue to reinforce concepts of **sharing and grouping** in a practical context, in a variety of ways.

"30 crayons shared equally between 5 pots":
30 divided by 5 = 6
30 ÷ 5 = 6 **[sharing]**
"30 crayons shared equally between 10 pots":
30 divided by 10 = 3
30 ÷ 10 = 3 **[sharing]**
"We have 30 crayons and put 10 crayons in each pot. How many pots do we need?"
30 divided by 10 = 3
30 ÷ 10 = 3 **[grouping]**
"We have 30 crayons and put 3 crayons in each pot. How many pots do we need?"
30 divided by 3 = 10
30 ÷ 3 = 10 **[grouping]**

Halving

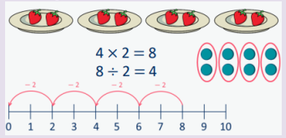
Find half of even numbers up to 40. Explore what happens when halving an odd number.
Look at doubles of even numbers and seeing half of odd numbers as one left over or $\frac{1}{2}$

Begin to know the halves of multiples of 10, up to 100 (e.g. half of 70 is 35).

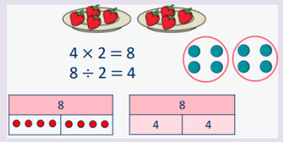
Make links to fractions $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{1}{3}$. Teach explicitly the links between fractions and division (e.g. half is the same as dividing by 2; a third is the same as dividing by 3 and a quarter as dividing by 4).

Divide by 2

Encourage children to compare the grouping and sharing structures of division and to make links with times-table facts, repeated subtraction and halving.



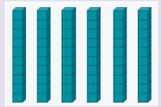
There are … equal groups of 2
… ÷ 2 = …



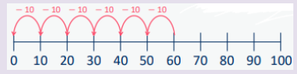
… shared equally between 2 is …
Half of … is …
… ÷ 2 = …

Divide by 10

Encourage children to compare the grouping and sharing structures of division and to make links with repeated subtraction and times-table facts.

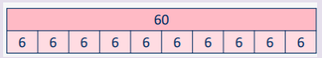


There are … equal groups of 10



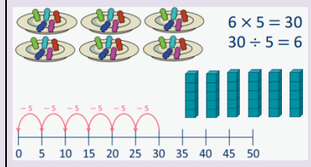
… ÷ 10 = …
6 × 10 = 60
60 ÷ 10 = 6

… shared equally between 10 is …
… ÷ 10 = …
6 × 10 = 60
60 ÷ 10 = 6

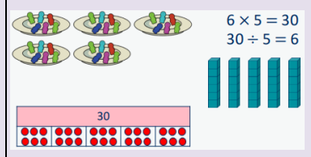


Divide by 5

Encourage children to compare the grouping and sharing structures of division and to make links with repeated subtraction and times-table facts.



There are … equal groups of
… ÷ 5 = …



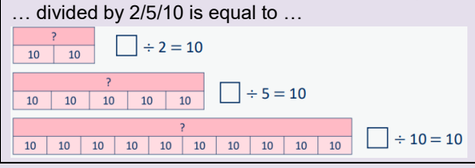
… shared equally between is …
… ÷ 5 = …

Children must be secure at counting in multiplication tables both forwards and backwards. Find the inverse of multiplication and division sentences by creating four linking number sentences.

3 x 5 = 15
5 x 3 = 15
15 ÷ 5 = 3
15 ÷ 3 = 5

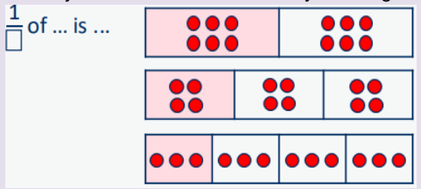
Missing numbers

Bar models are useful to show the link between multiplication and division.
… divided by 2/5/10 is equal to …

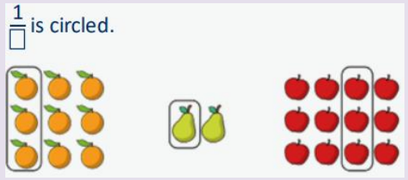


Unit Fractions

In Year 2 the focus is on finding $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{1}{3}$. Bar models are useful to show the link between division and finding a fraction.
The objects have been shared fairly into … groups.

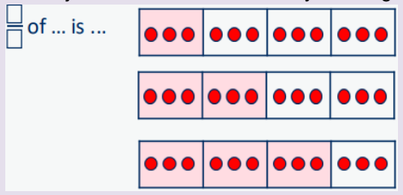


There are … equal parts.
There is … part circled.

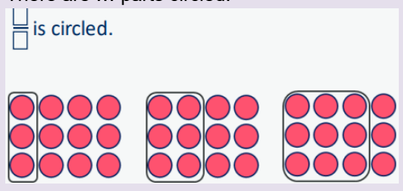


Non-unit fractions

In Year 2 the focus is on finding fractions $\frac{2}{4}$ and $\frac{3}{4}$.
Prompt children to notice that $\frac{2}{4}$ is equivalent to $\frac{1}{2}$.
The objects have been shared fairly into … groups.



There are … equal parts.
There are … parts circled.



Key Vocabulary:
Halve, half, share, share equally, shared between, one each, two each…, group, in pairs, threes, equal groups of, divide, divided by, divided into, left over, estimate, fraction, whole, quarter, is the same as, is equal to, groups of, repeated subtraction, inverse, number line, array, efficient

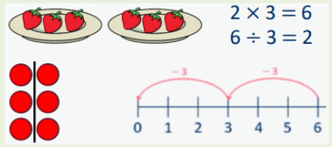
Mental Strategies:
To know that division is the inverse of multiplication
Recall division facts for the 2, 5 and 10 times tables
Recall halves for even numbers up to and including 20

Year 3 - DIVISION

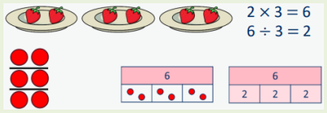
- **Count in multiples of 4, 6, 7, 8, 9, 12, 50 from 0, and in hundreds from any number, forward or backward.**
- **Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables.**
- **Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.**
- **Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.**
- **Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators.**

Divide by 3

Encourage children to compare the grouping and sharing structures of division and to make links with times-table facts.



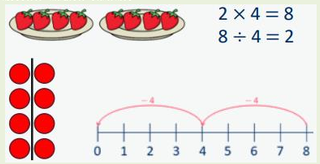
There are … groups of in …
… ÷ 3 =



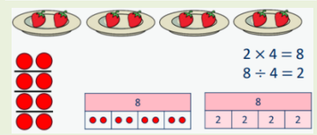
… has been shared equally into equal groups.
… ÷ 3 =

Divide by 4

Encourage children to compare the grouping and sharing structures of division and to make links with times-table facts.



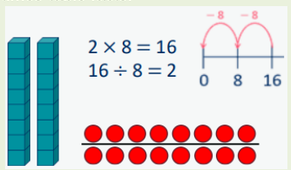
There are … groups of in …
… ÷ 4 =



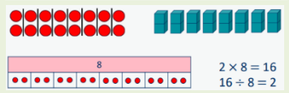
… has been shared equally into equal groups.
… ÷ 4 =

Divide by 8

Encourage children to compare the grouping and sharing structures of division and to make links with times-table facts.



There are … groups of in …
… ÷ 8 =



… has been shared equally into equal groups.
… ÷ 8 =

Related facts

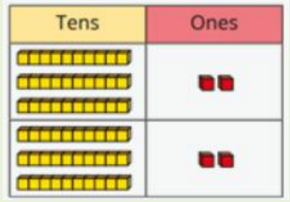
Link to known times-table facts.

… ÷ … is equal to …,
so … tens ÷ … is equal to … tens.

12 ÷ 3 = 4
120 ÷ 3 = 40

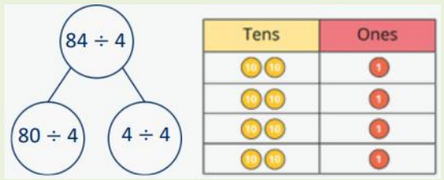
Divide a 2-digit number by a 1-digit number - no exchange

Partition into tens and ones to divide and then recombine.



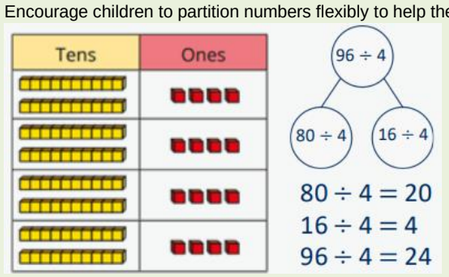
… tens divided by … is equal to … tens.
… ones divided by … is equal to … ones.

60 ÷ 2 = 30
4 ÷ 2 = 2
64 ÷ 2 = 32



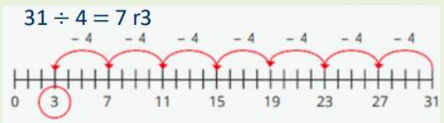
Divide a 2-digit number by a 1-digit number - with remainders

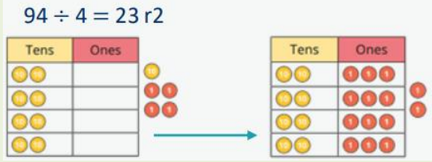
Encourage children to partition numbers flexibly to help them to divide more efficiently.



… tens divided by … is equal to … tens.
… ones divided by … is equal to … ones.

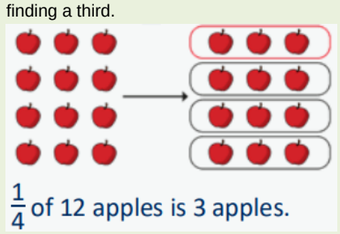
There are … groups of …
There are … remaining.



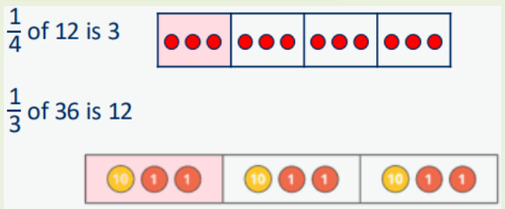


Unit fractions of a set of objects

Bar models are useful to show the link between division and fractions, for example, dividing by 3 and finding a third.



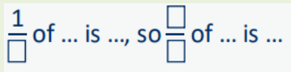
The whole is divided into … equal parts.
Each part is $\frac{1}{?}$ of the whole.

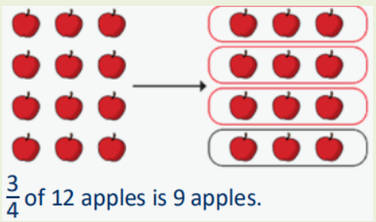


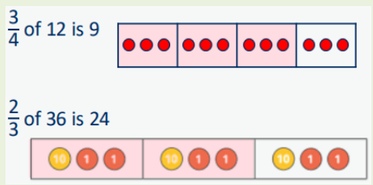
One … of … is …

Non-unit fractions of a set of objects

Bar models are a useful representation and show the links with division and multiplication.
The whole is divided into … equal parts.
Each part is $\frac{1}{?}$ of the whole.







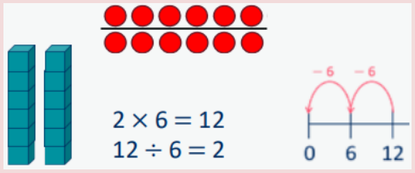
Key Vocabulary: Halve, half, share, share equally, one each, two each… group in pairs, threes, equal groups of, divide, divided by, divided into, left over, estimate, fraction, whole, quarter, is the same as, is equal to, groups of, repeated subtraction, inverse, number line, array, quotient, divisor, dividend, remainder, divisor, short division, efficient
Mental Strategies: Know the division facts from the 3, 4 and 8 times tables Use knowledge of place value to calculate division (e.g. 14 ÷ 2 = 7, 140 ÷ 2 = 70, 1400 ÷ 2 = 700)

Year 4 - DIVISION

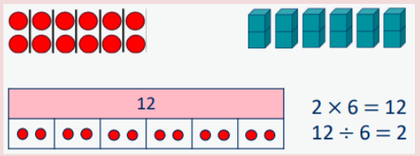
- **Recall division facts for multiplication tables up to 12 × 12.**
- **Use place value, known and derived facts to divide mentally, including: dividing by 1.**
- **Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths.**
- **Use place value, known and derived facts to multiply and divide mentally, including: multiplying and dividing by 10 and 100 and 1.**
- **Pupils practise to become fluent in the formal written method of short division with exact answers when dividing by a one-digit number.**
- **Pupils practise mental methods and extend this to three-digit numbers to derive facts, for example 200 × 3 = 600 so 600 ÷ 3 = 200.**
- **Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers. This should include correspondence questions such as three cakes shared equally between 10 children.**

Division facts to 12 × 12

Encourage children to compare the grouping and sharing structures of division and to make links with times-table facts.



There are … groups of … in …
… ÷ … =



… has been shared equally into … equal groups.
… ÷ … =

Divide a number by 1 and itself

Children may try to divide a number by zero and it should be highlighted that this is not possible.

When I divide a number by 1, the number remains the same.

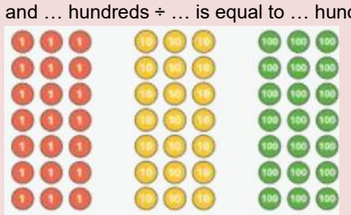
5 shared between 1 is 5
There are 5 groups of 1 in 5

When I divide a number by itself, the answer is 1
5 shared between 5 is 1
There is 1 group of 5 in 5.

Related facts

Link to known times-table facts.

… ÷ … is equal to …
so … tens ÷ … is equal to … tens
and … hundreds ÷ … is equal to … hundreds.



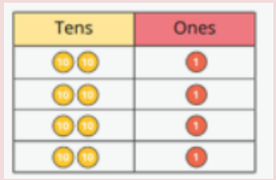
21 ÷ 7 = 3
210 ÷ 7 = 30
2,100 ÷ 7 = 300

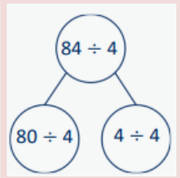
21 ÷ 3 = 7
210 ÷ 3 = 70
2,100 ÷ 3 = 700

Divide a 2 or 3-digit number by a 1-digit number

Progress from divisions with no exchange, to divisions with exchange and then divisions with remainders.

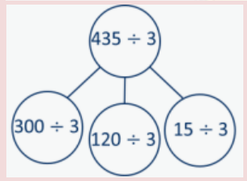
I can partition … into … tens and … ones.





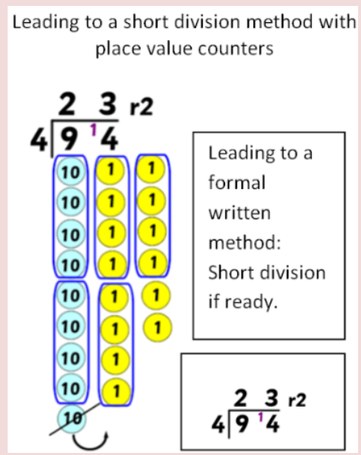
80 ÷ 4 = 20
4 ÷ 4 = 1
84 ÷ 4 = 21

I cannot share the hundreds/tens equally, so I need to exchange 1 … for 10 …



300 ÷ 3 = 100
120 ÷ 3 = 40
15 ÷ 3 = 5
435 ÷ 3 = 145

Leading to a short division method with place value counters

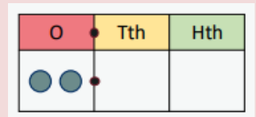


Divide by 10 and 100

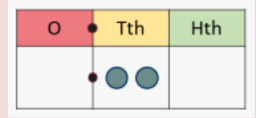
Encourage children to notice that dividing by 100 is the same as dividing by 10 twice.

When I divide by 10, the digits move 1 place value column to the right.

… is one-tenth the size of …



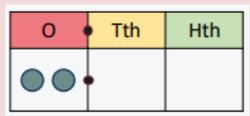
2 ÷ 10 = 0.2



12 ÷ 10 = 1.2

When I divide by 100, the digits move 2 place value columns to the right.

… is one-hundredth the size of …



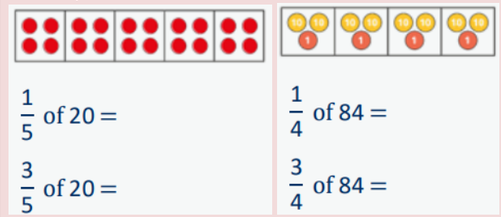
2 ÷ 100 = 0.02

12 ÷ 100 = 0.12

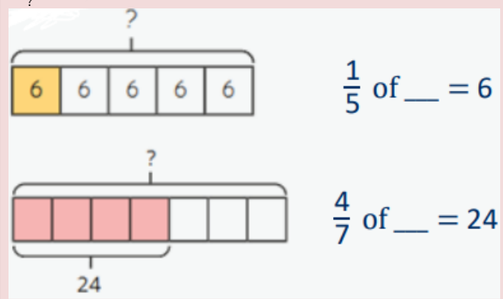
Fraction of an amount

Bar models support children to understand that to find a fraction of an amount, we divide by the denominator and multiply by the numerator.

To find $\frac{?}{?}$ of … , I need to divide by … and multiply by …



If $\frac{1}{?}$ is … , then the whole is … × …



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Mental Strategies:
Recall and use division facts for multiplication tables up to 12x12 (by the end of year 4)

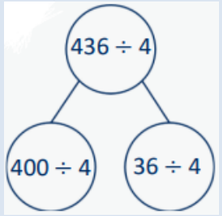
YEAR 5 - DIVISION

- **Divide numbers mentally drawing upon known facts.**
- **Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context.**
- **Divide whole numbers and those involving decimals by 10, 100 and 1,000.**
- **Solve problems involving multiplication and division, including using their knowledge of factors and multiples, squares and cubes.**
- **Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign.**

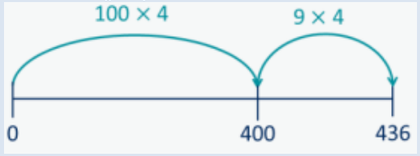
Mental strategies

Children use their known times table facts.

I can partition … into … and … to help me to divide more easily.



I can show groups of … on a number line.



To divide by …, I can divide by … and then divide the result by …

436 ÷ 4 = 436 ÷ 2 ÷ 2

436 ÷ 2 = 218

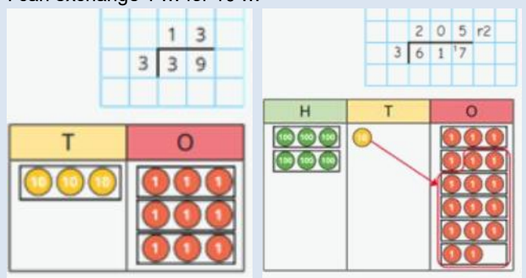
218 ÷ 2 = 109

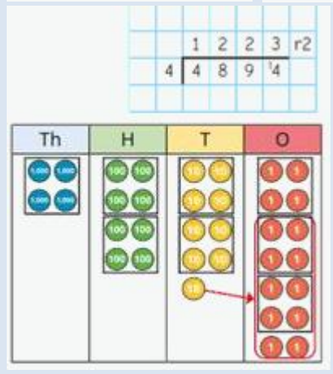
Divide numbers up to 4 digits by a 1-digit number

Children become confident with the formal short division method (bus stop).

There are … groups of … hundreds/tens/ones/ in …

I can exchange 1 … for 10 …



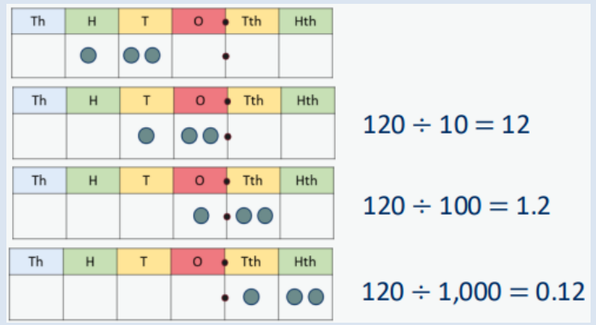


Divide by 10, 100 and 1,000

Encourage children to notice that dividing by 100 is the same as dividing by 10 twice, and that dividing by 1,000 is the same as dividing by 10 three times.

To divide by 10/100/1,000, I move all the digits … places to the right.

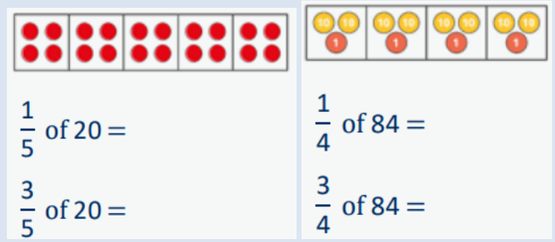
… is one-tenth/one-hundredth/one-thousandth the size of …



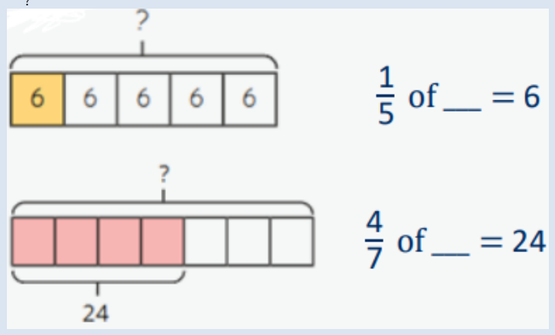
Fraction of an amount

Bar models support children to understand that to find a fraction of an amount, we divide by the denominator and multiply by the numerator.

To find $\frac{?}{?}$ of … , I need to divide by … and multiply by …



If $\frac{1}{?}$ is … , then the whole is … × …



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Mental Strategies:

Multiply and divide numbers mentally drawing upon known facts

Associate fractions with division

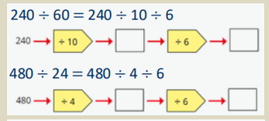
YEAR 6 - DIVISION

- **Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context.**
- **Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context.**
- **Perform mental calculations, including with mixed operations and large numbers.**
- **Divide numbers by 10, 100 and 1,000 giving answers up to three decimal places.**
- **Use written division methods in cases where the answer has up to two decimal places.**
- **Associate a fraction with division and calculate decimal fraction equivalents.**
- **Divide proper fractions by whole numbers.**
- **Solve problems involving the calculation of percentages.**
- **Use their knowledge of the order of operations to carry out calculations involving the 4 operations.**
- **Solve problems involving addition, subtraction, multiplication and division.**
- **Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.**

Mental Strategies

Include partitioning and number line strategies outlined in Y5 as well as division using factors. These methods should be discussed as potentially more efficient.

To divide by … , I can first divide by … and then divide the answer by …



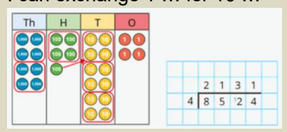
Short division

Encourage children to interpret remainders in context, for example knowing that " remainder 1" could mean complete boxes with 1 left over so 5 boxes will be needed.

There are … groups of …

hundreds/tens/ones/ in …

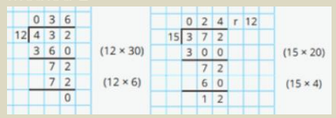
I can exchange 1 … for 10 …



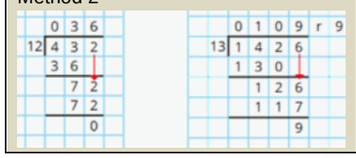
Long division

The long division method is introduced for the first time. Introduce method 1 before children become fluent in method 2.

Method 1



Method 2

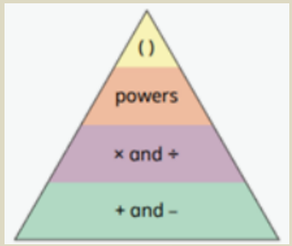


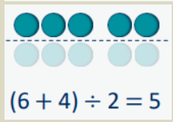
Order of operations

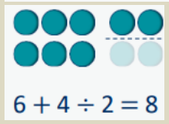
Calculations in brackets should be done first, then

powers. Multiplication and division should be performed before addition and subtraction.

… has greater priority than …, so the first part of the calculation I need to do is ...



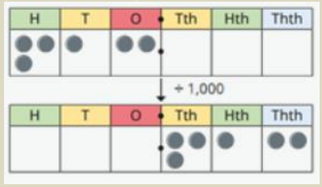




Divide by 10, 100 and 1,000

Encourage children to notice that dividing by 100 is the same as dividing by 10 twice, and that dividing by 1,000 is the same as dividing by 10 three times.

To divide by … , I move the digits … places to the right.



312 ÷ 10 = 31.2

312 ÷ 100 = 3.12

312 ÷ 1,000 = 0.312

906 ÷ 10 = 90.6

906 ÷ 100 = 9.06

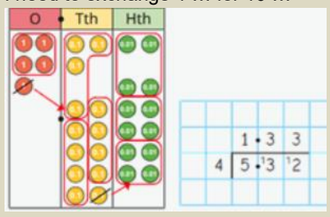
906 ÷ 1,000 = 0.906

Divide decimals by integers

This is the first time children divide decimals by numbers other than 10, 100 or 1,000.

I know that …÷ … = …, so I also know that …÷ … = …

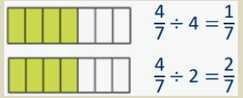
I need to exchange 1 … for 10 …



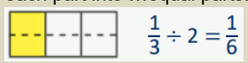
Divide a fraction by an integer

This is the first time children divide fractions by an integer.

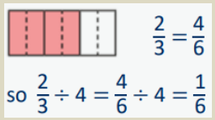
… ones divided by 2 is … ones so … sevenths divided by 2 is … sevenths.



I am dividing by … , so I can split each part into …equal parts.



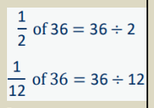
… is equivalent to … so …÷ … = …÷ …



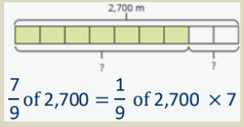
Fraction of an amount

Children divide and multiply to find fractions of an amount. Bar models can still be used to support understanding where needed.

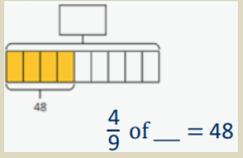
To find $\frac{1}{?}$ I divide by …



If $\frac{1}{?}$ is equal to …, then $\frac{?}{?}$ are equal to …



If $\frac{?}{?}$ is equal to …, then the whole is equal to …

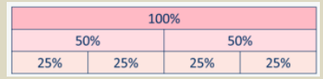


Calculate percentages

Children first learn how to find 1%, 10%, 20%, 25% and 50% before using multiples of these amounts to find any percentage.

There are … lots of … % in 100%

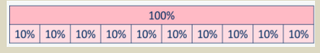
To find … %, I need to divide by …



0% of … = …÷ 2

2 % of … = …÷ 4

… % is made up of … %, and … %



To find 30%, I can find 10% and then multiply it by 3

To find 23%, I can use 10% × 2 and 1% × 3

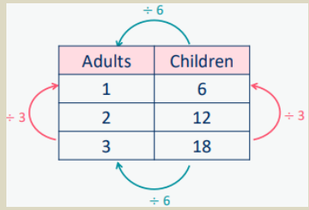
To find 99%, I can find 1%, then subtract from 100%

Calculations involving ratio

Encourage children to see the multiplicative relationship between ratios. They will need to multiply or divide each value by the same number to keep the ratio equivalent. Double number lines and ratio tables help children to see both horizontal and vertical multiplicative relationships.

For every … , there are …

For every 6 children on a school trip, there is 1 adult.



Key Vocabulary: Halve, half, share, share equally, one each, two each…, group, in pairs, threes, equal groups of, divide, divided by, divided into, left over, estimate, fraction, whole, quarter, is the same as, is equal to, groups of, repeated subtraction, inverse, number line, array, quotient, divisor, dividend, remainder, divisor, short division, long division, decimal, decimal point, tenth, hundredth, thousandth, integer, estimating, approximating, percentage, ratio, multiplicative
Mental Strategies: Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy Calculate a fraction of an amount