RANBY HOUSE PREP SCHOOL
STAND OUT FROM THE CROWD

A Guide for Ranby House Parents

HOW WE TEACH MATHEMATICS

RANBY HOUSE

Helping your child with calculations

www.wsnl.co.uk/prep

Your child's FUTURE matters to us.
'BE the BEST you can BE in all that you do.'
Being THE sector leading school in the area and the FIRST SCHOOL of CHOICE for parents and families.

RANBY HOUSE PREP SCHOOL
STAND OUT FROM THE CROWD

The following calculation guide has been devised to meet the requirements of the National Curriculum 2014
for the teaching and learning of mathematics, and is also designed to ensure a consistent and progressive approach to learning calculations across the school. Please note that early learning in Number and Calculation in EYFS (Nursery 1, 2 and Reception) follows the "Development Matters" EYFS document, and this calculation policy is designed to build progressively from the content and methods established in the Early Years Foundation Stage.

Age and stage expectations

Calculation procedures are taught according to this document so they can be seamlessly built upon year after year, as the child moves through school.

The policy has been taken and adapted to suit from White Rose Maths. We have found their calculation policy to be the one which works for the needs of our children and suits the way in which we teach Maths. The use of concrete resources and visuals underpins this calculation policy, which is what you would see in a maths lesson.

Providing a context for calculation

It is important that any type of calculation is given a real-life context to help build children's understanding of the purpose of calculation, and to help them recognise when to use certain operations and methods when faced with problems. This is done through problem solving and reasoning puzzles.

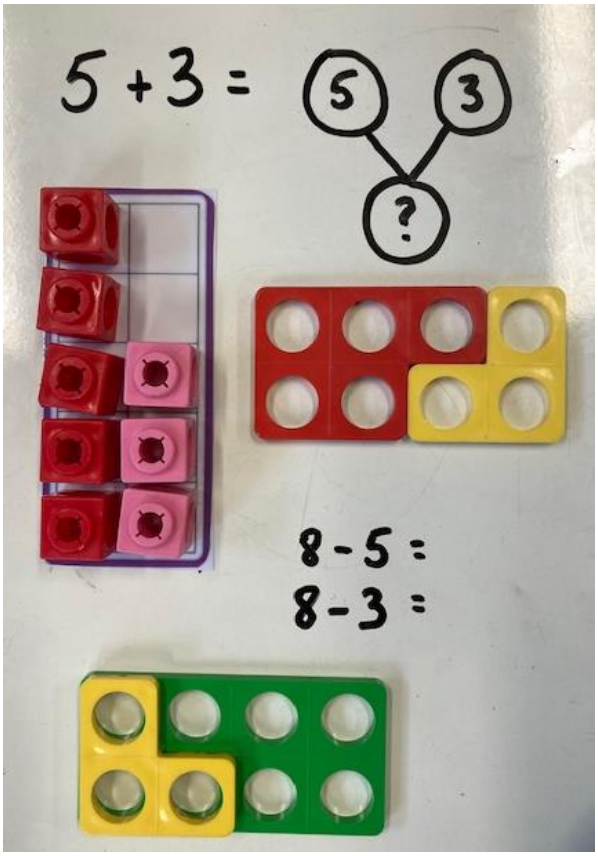
Choosing a calculation method

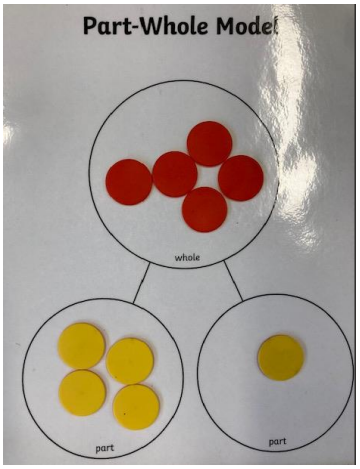
Each operation is broken down into skills for the year group and shows recommended models and visuals to support the teaching of the corresponding concepts alongside.

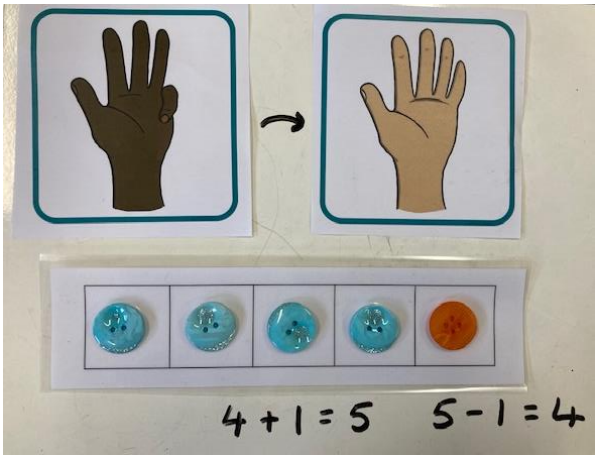
Addition

Reception

Use a range of hands-on practical manipulatives and visual equipment to represent 1 more and 1 less.







Number songs and practical equipment used daily.

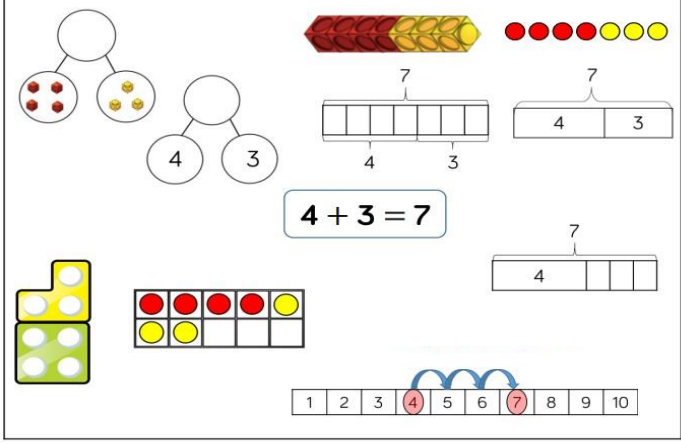
Key vocabulary: add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line

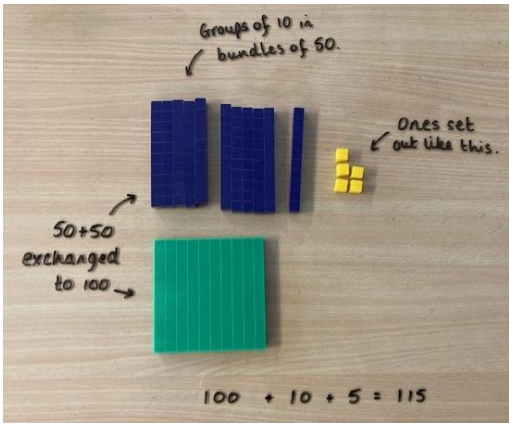
Key skills for addition at Reception:

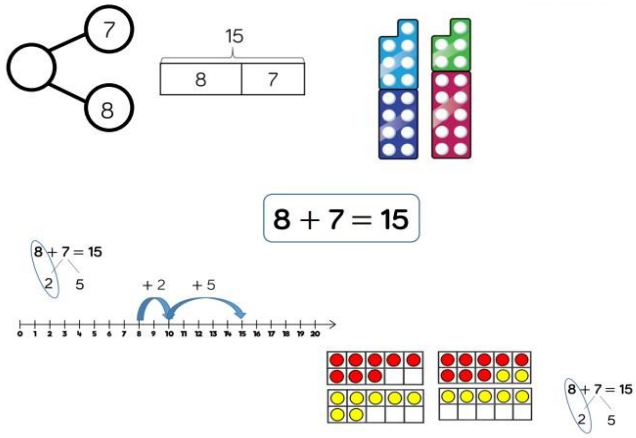
Read and begin to write numbers to 10 in numerals
Be introduced to counting in multiples of 1 and 2
Solve simple one-step problems involving addition, using objects, number lines and pictorial Representations
Subitise.

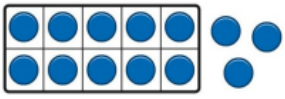
Addition

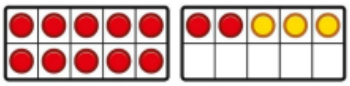
Y1

Skill: Add 1-digit numbers within 10	Year: 1
	When adding numbers to 10, children can explore both aggregation and augmentation. The part-whole model, discrete and continuous bar model, number shapes and ten frame support aggregation. The combination bar model, ten frame, bead string and number track all support augmentation.



Skill: Add 1 and 2-digit numbers to 20	Year: 1/2
	When adding one-digit numbers that cross 10, it is important to highlight the importance of ten ones equalling one ten. Different manipulatives can be used to represent this exchange. Use concrete resources alongside number lines to support children in understanding how to partition their jumps.

Understanding teen numbers as a complete 10 and some more Complete a group of 10 objects and count more. *13 is 10 and 3 more.*	**Understanding teen numbers as a complete 10 and some more** Use a ten frame to support understanding of a complete 10 for teen numbers.  *13 is 10 and 3 more.*	**Understanding teen numbers as a complete 10 and some more.** *1 ten and 3 ones equal 13.* *10 + 3 = 13*

Adding the 1s Children represent calculations using ten frames to add a teen and 1s.  *2 + 3 = 5* *12 + 3 = 15*	**Adding the 1s** Children recognise that a teen is made from a 10 and some 1s and use their knowledge of addition within 10 to work efficiently. *3 + 5 = 8* *So, 13 + 5 = 18*

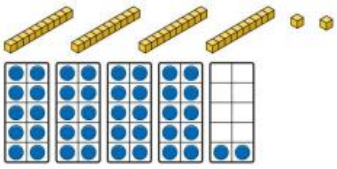
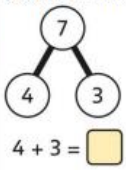
Key vocabulary: add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, part/whole model

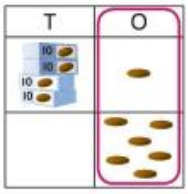
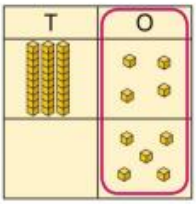
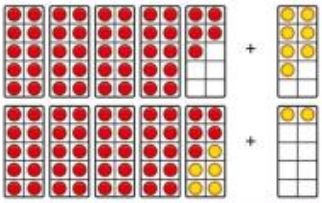
Key skills for addition at Y1:

Read and write numbers to 100 in numerals, including 1–20 in words within 20
Recall bonds to 10 and 20, and addition facts within 20
Count to and across 100 (using 100 square)
Count in multiples of 1, 2, 5 and 10
Solve simple one-step problems involving addition, using objects, number lines and pictorial representations including recognising the operation sign in a number sentence

Addition

Y2

Year 2			
Year 2 Addition	**Concrete**	**Pictorial**	**Abstract**
Understanding 10s and 1s	Group objects into 10s and 1s. Bundle straws to understand unitising of 10s. 	Understand 10s and 1s equipment, and link with visual representations on ten frames. 	Represent numbers on a place value grid, using equipment or numerals.
Adding 10s	Use known bonds and unitising to add 10s. *I know that 4 + 3 = 7.* *So, I know that 4 tens add 3 tens is 7 tens.*	Use known bonds and unitising to add 10s. *I know that 4 + 3 = 7.* *So, I know that 4 tens add 3 tens is 7 tens.*	Use known bonds and unitising to add 10s.  4 + 3 = ☐ *4 + 3 = 7* *4 tens + 3 tens = 7 tens* *40 + 30 = 70*

Adding a 1-digit number to a 2-digit number not bridging a 10	Add the 1s to find the total. Use known bonds within 10. *41 is 4 tens and 1 one.* *41 add 6 ones is 4 tens and 7 ones.* This can also be done in a place value grid.  	Add the 1s. *34 is 3 tens and 4 ones.* *4 ones and 5 ones are 9 ones.* *The total is 3 tens and 9 ones.* 
Adding a 1-digit number to a 2-digit number bridging 10	Complete a 10 using number bonds. *There are 4 tens and 5 ones.* *I need to add 7. I will use 5 to complete a 10, then add 2 more.*	Complete a 10 using number bonds. 

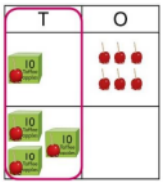
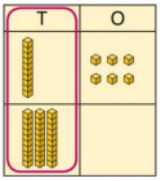
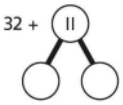
Key vocabulary: add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, ones, partition, addition, column, bar model, exchange

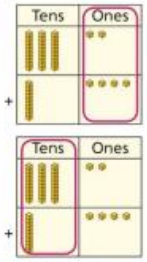
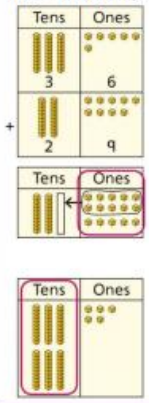
Key skills for addition at Y2:

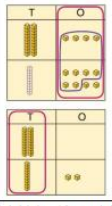
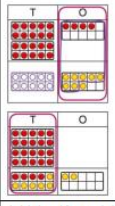
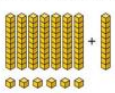
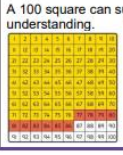
Add a 2-digit number and ones (e.g. 27 + 6)
Add a 2-digit number and tens (e.g. 23 + 40)
Add pairs of 2-digit numbers (e.g. 35 + 47)
Add three single-digit numbers (e.g. 5 + 9 + 7)
Show that adding can be done in any order (the commutative law)
Recall bonds to 20 and bonds of tens to 100 (30 + 70 etc)
Count in steps of 2, 3 and 5 and count in tens from any number
Understand the place value of 2-digit numbers (tens and ones)
Compare and order numbers to 100 using < > and = signs
Read and write numbers to at least 100 in numerals and words
Solve problems with addition, using concrete objects, pictorial representations, involving numbers, quantities and measures, and applying mental and written methods

Addition

Y2

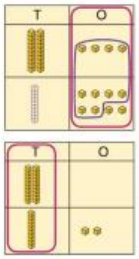
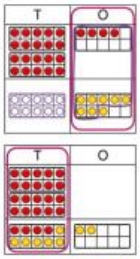
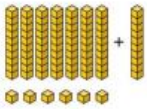
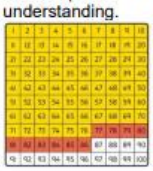
Adding a multiple of 10 to a 2-digit number using columns	Add the 10s using a place value grid to support.  *16 is 1 ten and 6 ones.* *30 is 3 tens.* *There are 4 tens and 6 ones in total.*	Add the 10s using a place value grid to support.  *16 is 1 ten and 6 ones.* *30 is 3 tens.* *There are 4 tens and 6 ones in total.*	Add the 10s represented vertically. Children must understand how the method relates to unitising of 10s and place value.
Adding two 2-digit numbers	Add the 10s and 1s separately. *5 + 3 = 8* *There are 8 ones in total.* *3 + 2 = 5* *There are 5 tens in total.* *35 + 23 = 58*	Add the 10s and 1s separately. Use a part-whole model to support.  *11 = 10 + 1* *32 + 10 = 42* *42 + 1 = 43* *32 + 11 = 43*	

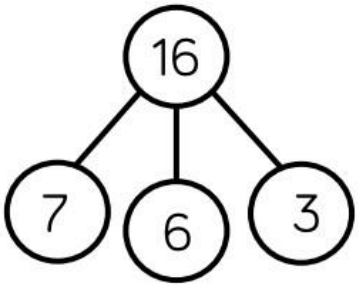
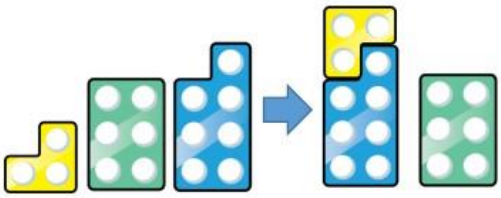
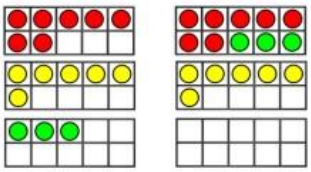
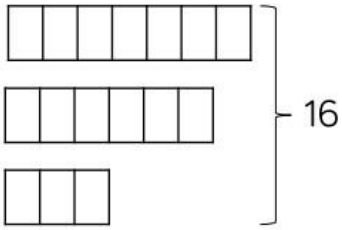
Adding two 2-digit numbers using a place value grid	Add the 1s. Then add the 10s. 
Adding two 2-digit numbers with exchange	Add the 1s. Exchange 10 ones for a ten. Then add the 10s. 

Adding a 1-digit number to a 2-digit number using exchange	Exchange 10 ones for 1 ten.  	Exchange 10 ones for 1 ten.  	Exchange 10 ones for 1 ten.
Adding a multiple of 10 to a 2-digit number	Add the 10s and then recombine. *27 is 2 tens and 7 ones.* *50 is 5 tens.* *There are 7 tens in total and 7 ones.* *So, 27 + 50 is 7 tens and 7 ones.*	Add the 10s and then recombine.  *66 is 6 tens and 6 ones.* *66 + 10 = 76* A 100 square can support this understanding. 	Add the 10s and then recombine. *37 + 20 = ?* *30 + 20 = 50* *50 + 7 = 57* *37 + 20 = 57*

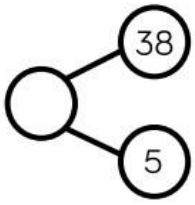
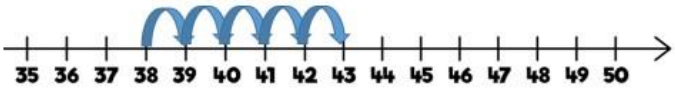
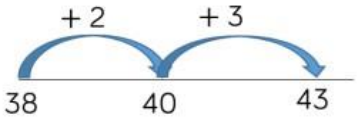
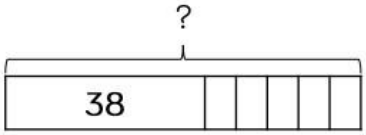
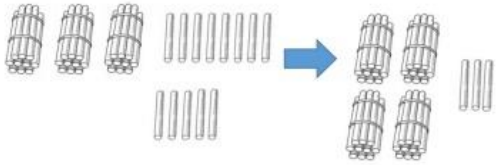
Addition

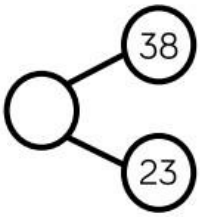
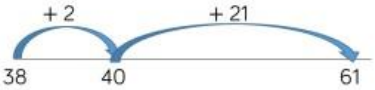
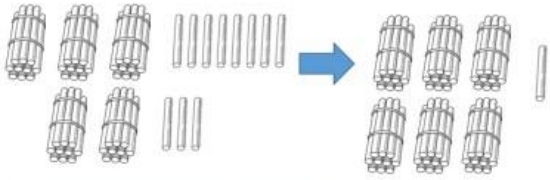
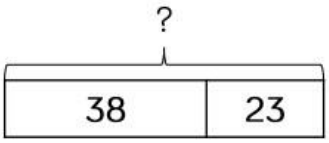
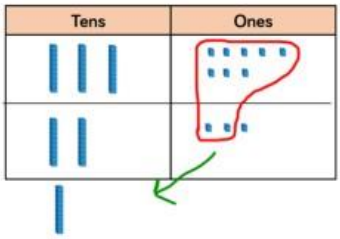
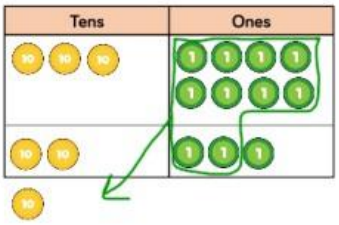
Y2

Adding a 1-digit number to a 2-digit number using exchange	Exchange 10 ones for 1 ten.  	Exchange 10 ones for 1 ten.  	Exchange 10 ones for 1 ten.
Adding a multiple of 10 to a 2-digit number	Add the 10s and then recombine. *27 is 2 tens and 7 ones.* *50 is 5 tens.* *There are 7 tens in total and 7 ones.* *So, 27 + 50 is 7 tens and 7 ones.*	Add the 10s and then recombine.  *66 is 6 tens and 6 ones.* *66 + 10 = 76* A 100 square can support this understanding. 	Add the 10s and then recombine. *37 + 20 = ?* *30 + 20 = 50* *50 + 7 = 57* *37 + 20 = 57*

Skill: Add three 1-digit numbers	Year: 2
  **7 + 6 + 3 = 16**  **7 + 6 + 3 = 16** 10  	When adding three 1-digit numbers, children should be encouraged to look for number bonds to 10 or doubles to add the numbers more efficiently. This supports children in their understanding of commutativity. Manipulatives that highlight number bonds to 10 are effective when adding three 1-digit numbers.

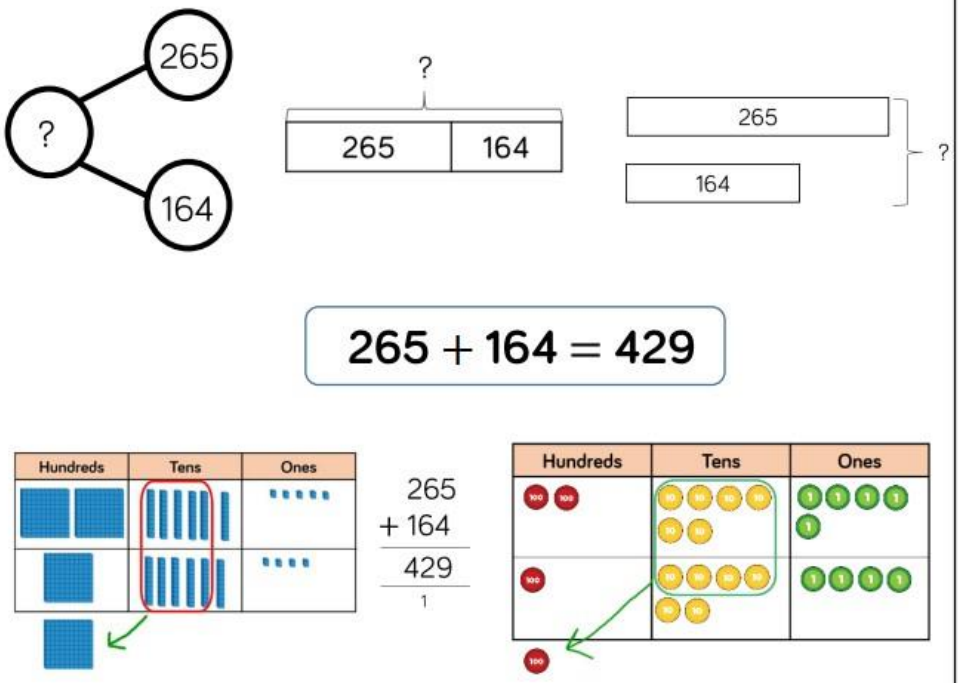
Addition

Skill: Add 1-digit and 2-digit numbers to 100	Year: 2/3
    **38 + 5 = 43**  1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100	When adding single digits to a two-digit number, children should be encouraged to count on from the larger number. They should also apply their knowledge of number bonds to add more efficiently e.g. 8 + 5 = 13 so 38 + 5 = 43. Hundred squares and straws can support children to find the number bond to 10.

Skill: Add two 2-digit numbers to 100	Year: 2/3
    **38 + 23 = 61**  38 + 23 61 1 	At this stage, encourage children to use the formal column method when calculating alongside straws, base 10 or place value counters. As numbers become larger, straws become less efficient. Children can also use a blank number line to count on to find the total. Encourage them to jump to multiples of 10 to become more efficient.

Addition

Y3

Skill: Add numbers with up to 3 digits	Year: 3
	Base 10 and place value counters are the most effective manipulatives when adding numbers with up to 3 digits. Ensure children write out their calculation alongside any concrete resources so they can see the links to the written column method. Plain counters on a place value grid can also be used to support learning.

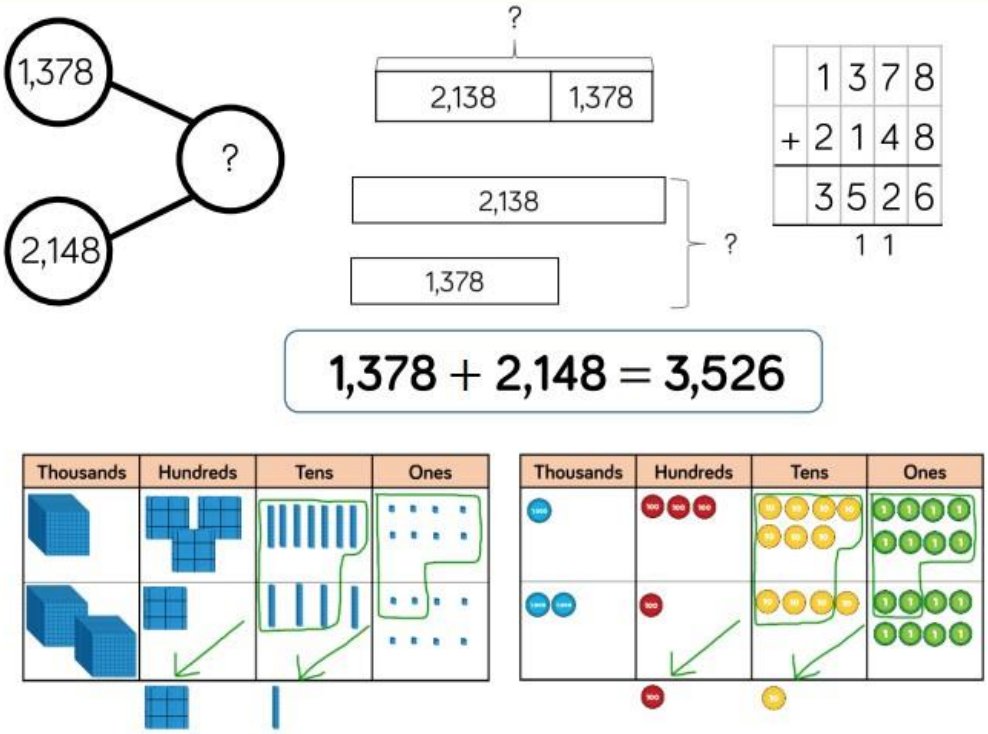
Key vocabulary: add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, ones, partition, plus, addition, column, tens boundary, exchange hundreds boundary, increase, vertical, "carry", expanded, compact

Key skills for addition at Y3:

Read and write numbers to 1000 in numerals and words
Add 2-digit numbers mentally, including those exceeding 100
Add a 3-digit number and ones mentally (175 + 8)
Add a 3-digit number and tens mentally (249 + 50)
Add a 3-digit number and hundreds mentally (381 + 400)
Estimate answers to calculations, using inverse to check answers
Solve problems, including missing number problems, using number facts, place value, and more complex addition
Recognise place value of each digit in 3-digit numbers (hundreds, tens, ones)
Continue to practise a wide range of mental addition strategies, i.e. number bonds, adding the nearest multiple of 10, 100, 100 and adjusting, using near doubles, partitioning and recombining

Addition

Y4

Skill: Add numbers with up to 4 digits	Year: 4
	Base 10 and place value counters are the most effective manipulatives when adding numbers with up to 4 digits. Ensure children write out their calculation alongside any concrete resources so they can see the links to the written column method. Plain counters on a place value grid can also be used to support learning.

Key vocabulary: add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, ones, partition, plus, addition, column, tens boundary, hundreds boundary, increase, vertical, "carry", expanded, compact, thousands, hundreds, digits, inverse

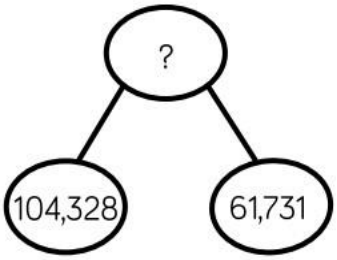
Key skills for addition at Y4:

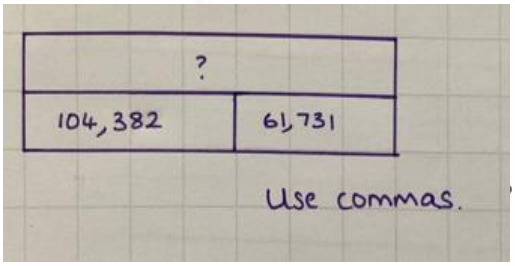
Select most appropriate method: mental, jottings or written and explain why
Recognise the place value of each digit in a 4-digit number
Round any number to the nearest 10, 100 or 1000
Estimate and use inverse operations to check answers
Solve two-step problems in context, deciding which operations and methods to use and why
Find 1000 more or less than a given number
Continue to practise a wide range of mental addition strategies, i.e. number bonds, add the nearest multiple of 10, 100, 1000 and adjust, use near doubles, partitioning and recombining
Add numbers with up to 4 digits using the formal written method of column addition
Solve two-step problems in contexts, deciding which operations and methods to use and why
Estimate and use inverse operations to check answers to a calculation

Addition

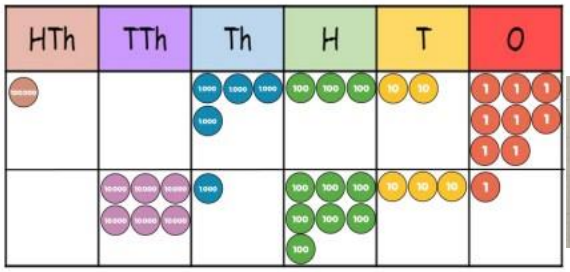
Y5

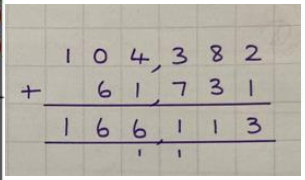
Skill: Add numbers with more than 4 digits	Year: 5/6





104,328 + 61,731 = 166,059

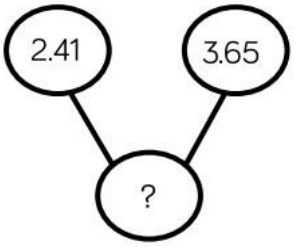


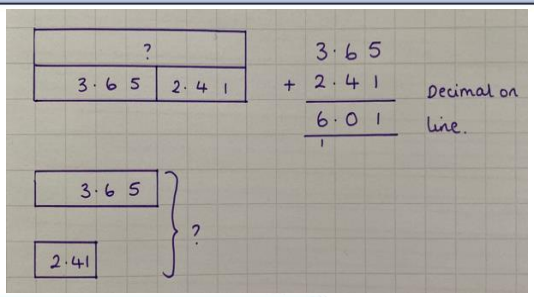


Place value counters or plain counters on a place value grid are the most effective concrete resources when adding numbers with more than 4 digits.

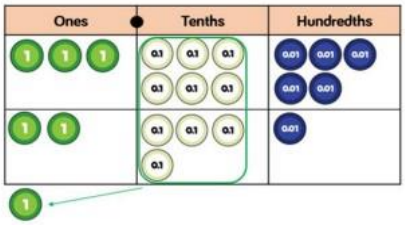
At this stage, children should be encouraged to work in the abstract, using the column method to add larger numbers efficiently.

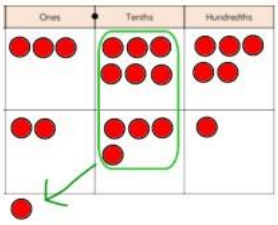
Skill: Add with up to 3 decimal places	Year: 5





3.65 + 2.41 = 6.06





Place value counters and plain counters on a place value grid are the most effective manipulatives when adding decimals with 1, 2 and then 3 decimal places.

Ensure children have experience of adding decimals with a variety of decimal places. This includes putting this into context when adding money and other measures.

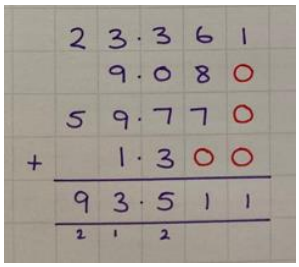
Key vocabulary: add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, ones, partition, plus, addition, column, tens boundary, exchange hundreds boundary, increase, "carry", expanded, compact, vertical, thousands, hundreds, digits, inverse & decimal places, decimal point, tenths, hundredths, thousandths, million

Key skills for addition at Y5:

Add numbers mentally with increasingly large numbers, using and practising a range of mental strategies, i.e. add the nearest multiple of 10, 100, 1000 and adjust; use near doubles, inverse, partitioning and re-combining; using number bonds
Use rounding to check answers and accuracy
Solve multi-step problems in contexts, deciding which operations and methods to use and why
Read, write, order and compare numbers to at least 1 million and determine the value of each digit
Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000
Add numbers with more than 4 digits using formal written method of column addition

Addition

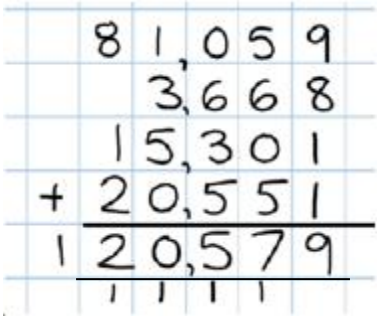
Year 6 Add several numbers of increasing complexity



Adding several numbers with different numbers of decimal places (including money and measures):

- Tenths, hundredths and thousandths should be correctly aligned, with the decimal point lined up vertically including in the answer row.
- Zeros could be added into any empty decimal places, to show that there is no value to add.

Empty decimal places can be filled with zero to show the place value in each column.



Adding several numbers with more than 4 digits.

Key vocabulary: add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, ones, partition, plus, addition, column, tens boundary, hundreds boundary, increase, "carry", exchange, expanded, compact, vertical, digits, inverse, decimal places, decimal point, tenths, hundredths, thousandths including all place value vocabulary from hundreds to million

Key skills for addition at Y6:

Perform mental calculations, including with mixed operations and large numbers, using and practising a range of mental strategies
Solve multi-step problems in context, deciding which operations and methods to use and why
Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy
Read, write, order and compare numbers up to 10 million and determine the value of each digit
Round any whole number to a required degree of accuracy
Pupils understand how to add mentally with larger numbers and calculations of increasing complexity

Subtraction

Reception

Subtract from numbers up to 5

Children have an understanding of subtraction practically, showing subtraction on bead strings, using cubes etc. and in familiar contexts, and are gradually introduced to more formal recording using number lines as below:

Be introduced to read, write and interpret number sentences with +, - and = signs.

Subtract by taking away

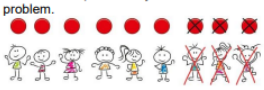
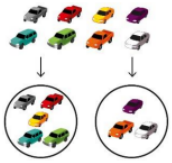
6 – 2 = 4

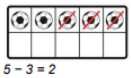
Children will engage in a variety of counting songs and rhymes and practical activities.

In practical activities and through discussion they will begin to use the vocabulary associated with subtraction.

They will find one less than a given number.

Model subtraction using numbered number lines/tracks and practically.

EYFS Subtraction	**Counting back and taking away** Children arrange objects and remove to find how many are left. *1 less than 6 is 5.* *6 subtract 1 is 5.*	**Counting back and taking away** Children draw and cross out or use counters to represent objects from a problem.  9 – ☐ = ☐ There are ☐ children left.	**Counting back and taking away** Children count back to take away and use a number line or number track to support the method. *9 – 3 = 6*
	Finding a missing part, given a whole and a part Children separate a whole into parts and understand how one part can be found by subtraction.  *8 – 5 = ?*		

	Subtraction within 10 Understand when and how to subtract 1s efficiently. Use a bead string to subtract 1s efficiently. *5 – 3 = 2*	**Subtraction within 10** Understand when and how to subtract 1s efficiently.  *5 – 3 = 2*	**Subtraction within 10** Understand how to use knowledge of bonds within 10 to subtract efficiently. *5 – 3 = 2*

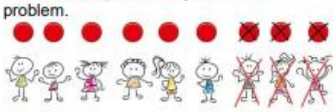
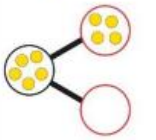
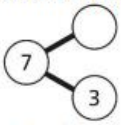
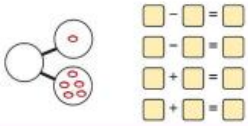
Key vocabulary: equal to, take, take away, less, minus, subtract, leaves, how many more, how many fewer / less than, most, least, count back, how many left, how much less is_?

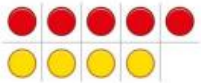
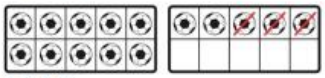
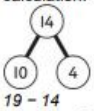
Key skills for subtraction at Reception:

- Given a number, say **one more or one less**
- Count to and over 10, **forward and back**, from any number
- Represent and use **subtraction facts to 10**
- Subtract with **one digit**, including zero
- Solve one-step problems that involve addition and subtraction, using concrete objects (i.e. bead string, objects, cubes) and pictures, and missing number problems
- Read and write numbers from 0 to 10 in numerals

Subtraction

Y1

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

	Finding the difference Arrange two groups so that the difference between the groups can be worked out. *8 is 2 more than 6.* *6 is 2 less than 8.* *The difference between 8 and 6 is 2.*	**Finding the difference** Represent objects using sketches or counters to support finding the difference.  *5 − 4 = 1* *The difference between 5 and 4 is 1.*	**Finding the difference** Children understand 'find the difference' as subtraction. *10 − 4 = 6* *The difference between 10 and 6 is 4.*
	Subtraction within 20 Understand when and how to subtract 1s efficiently. Use a bead string to subtract 1s efficiently. *5 − 3 = 2* *15 − 3 = 12*	**Subtraction within 20** Understand when and how to subtract 1s efficiently.  *5 − 3 = 2* *15 − 3 = 12*	**Subtraction within 20** Understand how to use knowledge of bonds within 10 to subtract efficiently. *5 − 3 = 2* *15 − 3 = 12*
	Subtracting 10s and 1s For example: 18 − 12 Subtract 12 by first subtracting the 10, then the remaining 2. *First subtract the 10, then take away 2.*	**Subtracting 10s and 1s** For example: 18 − 12 Use ten frames to represent the efficient method of subtracting 12. *First subtract the 10, then subtract 2.*	**Subtracting 10s and 1s** Use a part-whole model to support the calculation.  *19 − 14* *19 − 10 = 9* *9 − 4 = 5* *So, 19 − 14 = 5*

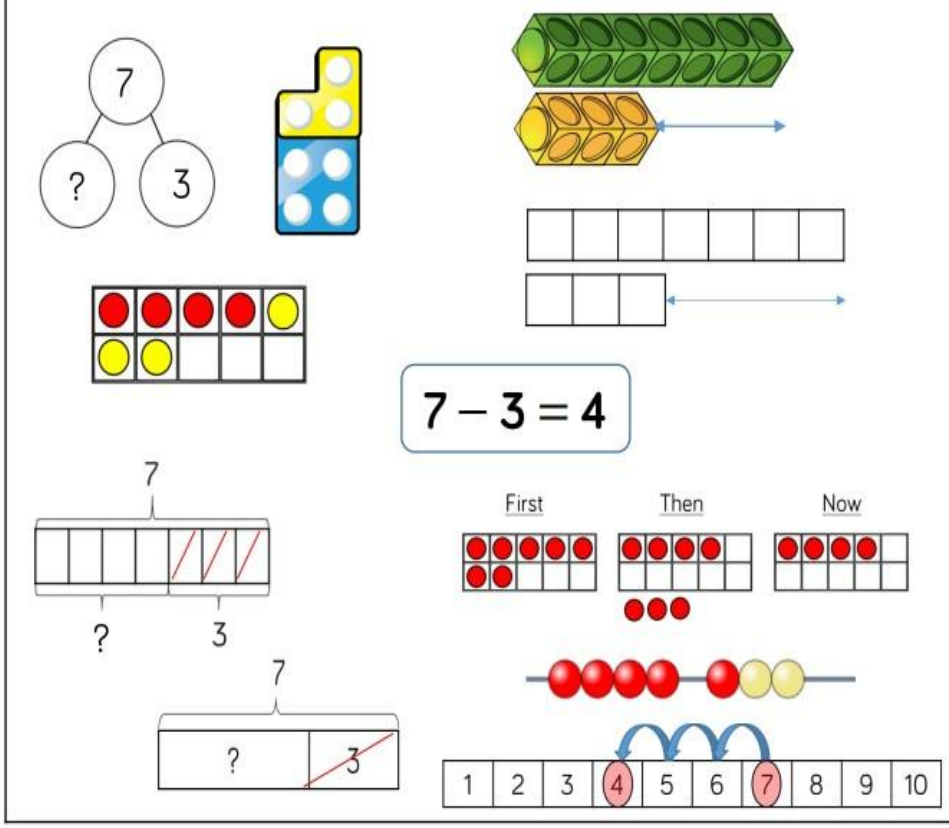
Key vocabulary: equal to, take, take away, less, minus, subtract, leaves, distance between, how many more, how many fewer / less than, most, least, count back, how many left, how much less is_?

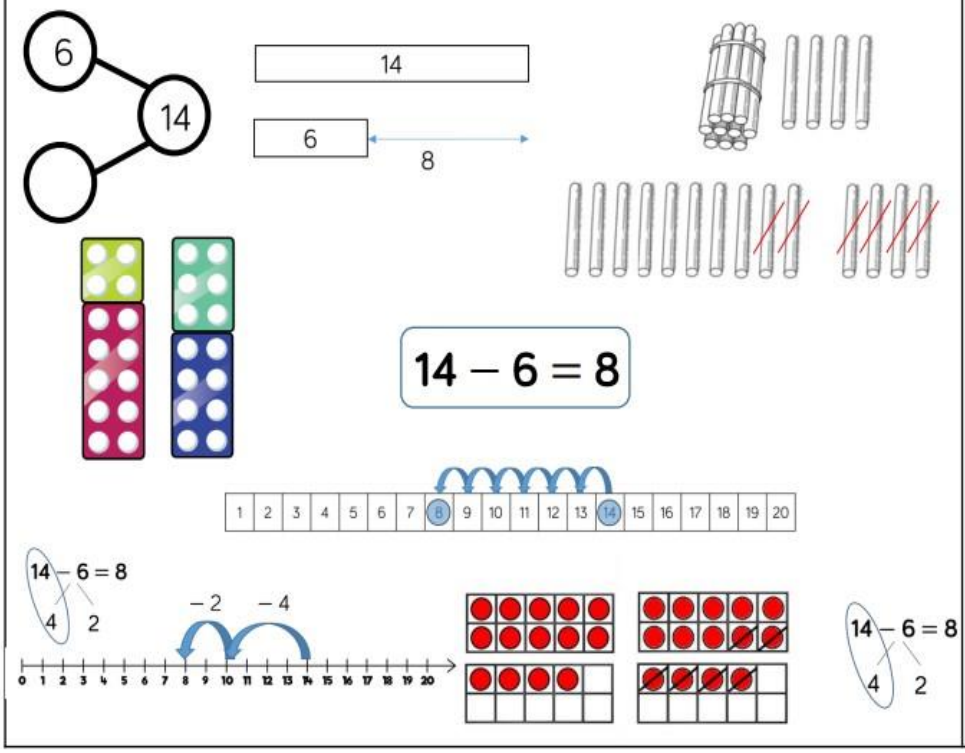
Key skills for subtraction at Y1:

Given a number, say **one more or one less**
Count to and over 100, **forward and back**, from any number
Represent and use **subtraction facts to 20 and within 20**
Subtract with **1-digit and 2-digit** numbers to 20, including zero
Solve one-step problems that involve addition and subtraction, using concrete objects (i.e. bead string, objects, cubes) and pictures, and missing number problems
Read and write numbers from 0 to 20 in numerals and words

Subtraction

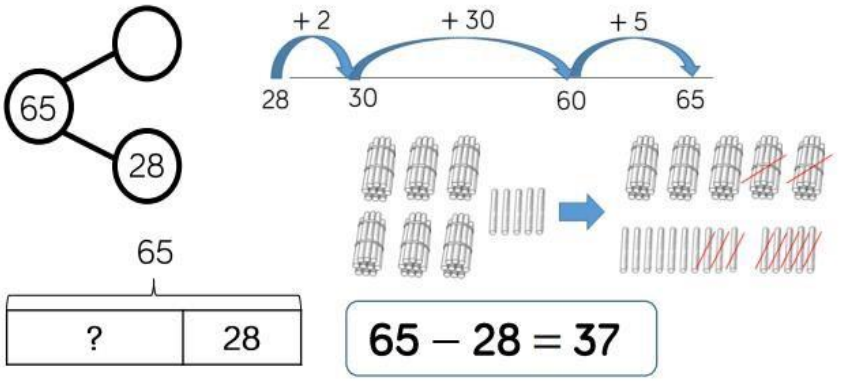
Y1

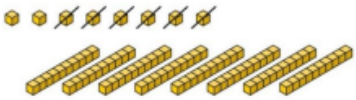
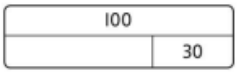
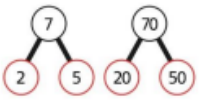
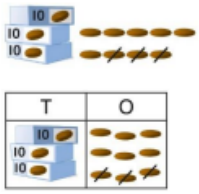
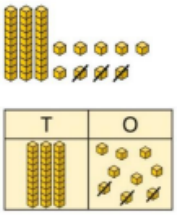
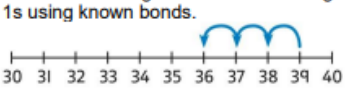
Skill: Subtract 1-digit numbers within 10	Year: 1
	Part-whole models, bar models, ten frames and number shapes support partitioning. Ten frames, number tracks, single bar models and bead strings support reduction. Cubes and bar models with two bars can support finding the difference.

Skill: Subtract 1 and 2-digit numbers to 20	Year: 1/2
	When subtracting one-digit numbers that cross 10, it is important to highlight the importance of ten ones equalling one ten. Children should be encouraged to find the number bond to 10 when partitioning the subtracted number. Ten frames, number shapes and number lines are particularly useful for this.

Subtraction

Y2

Skill: Subtract 1 and 2-digit numbers to 100	Year: 2
	At this stage, encourage children to use the formal column method when calculating alongside straws, base 10 or place value counters. As numbers become larger, straws become less efficient. Children can also use a blank number line to count on to find the difference. Encourage them to jump to multiples of 10 to become more efficient.

Year 2 Subtraction	Concrete	Pictorial	Abstract
Subtracting multiples of 10	Use known number bonds and unitising to subtract multiples of 10.  *8 subtract 6 is 2.* *So, 8 tens subtract 6 tens is 2 tens.*	Use known number bonds and unitising to subtract multiples of 10.  *10 – 3 = 7* *So, 10 tens subtract 3 tens is 7 tens.*	Use known number bonds and unitising to subtract multiples of 10.  *7 tens subtract 5 tens is 2 tens.* *70 – 50 = 20*
Subtracting a single-digit number	Subtract the 1s. This may be done in or out of a place value grid.  	Subtract the 1s. This may be done in or out of a place value grid.  	Subtract the 1s. Understand the link between counting back and subtracting the 1s using known bonds.  T O 3 9 – 3 3 6 *9 – 3 = 6* *39 – 3 = 36*

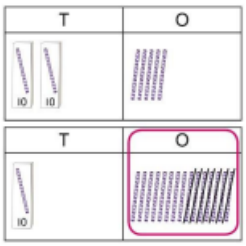
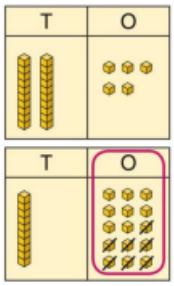
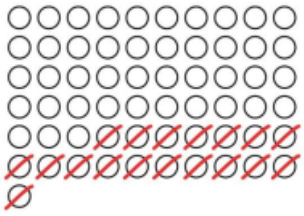
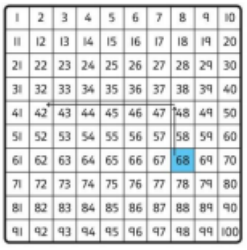
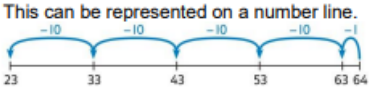
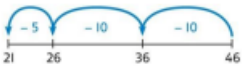
Key vocabulary: equal to, take, take away, less, minus, subtract, leaves, distance between, how many more, how many fewer / less than, most, least, count back, how many left, how much less is_?, difference, count on, strategy, partition, tens, ones

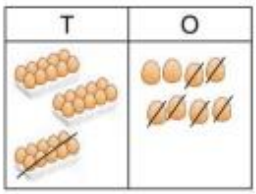
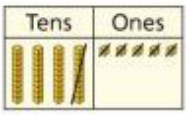
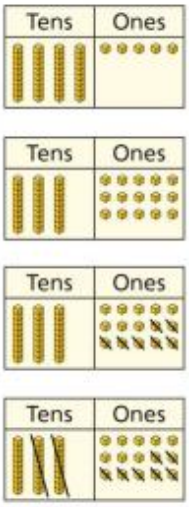
Key skills for subtraction at Y2:

Recognise the place value of each digit in a 2-digit number
Recall and use subtraction facts to 20 fluently, and derive and use related facts up to 100
Subtract using concrete objects, pictorial representations, 100 squares and mentally, including: a 2-digit number and ones, a 2-digit number and tens, and two 2-digit numbers
Show that subtraction of one number from another cannot be done in any order
Recognise and use inverse relationship between addition and subtraction, using this to check calculations and missing number problems
Solve simple addition and subtraction problems including measures, using concrete objects, pictorial representation, and also applying their increasing knowledge of mental and written methods
Read and write numbers to at least 100 in numerals and in words

Subtraction

Y2

Subtracting a single-digit number using exchange	Exchange 1 ten for 10 ones. This may be done in or out of a place value grid. 	Exchange 1 ten for 10 ones. 	Exchange 1 ten for 10 ones.
Subtracting a 2-digit number	Subtract by taking away.  *61 − 18* *I took away 1 ten and 8 ones.*	Subtract the 10s and the 1s. This can be represented on a 100 square.  1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100	Subtract the 10s and the 1s. This can be represented on a number line.  *64 − 41 = ?* *64 − 1 = 63* *63 − 40 = 23* *64 − 41 = 23*  *46 − 20 = 26* *26 − 5 = 21* *46 − 25 = 21*

Subtracting a 2-digit number using place value and columns	Subtract the 1s. Then subtract the 10s. This may be done in or out of a place value grid.  *38 − 16 = 22*	Subtract the 1s. Then subtract the 10s. 
Subtracting a 2-digit number with exchange		Exchange 1 ten for 10 ones. Then subtract the 1s. Then subtract the 10s. 

Subtraction

Y2

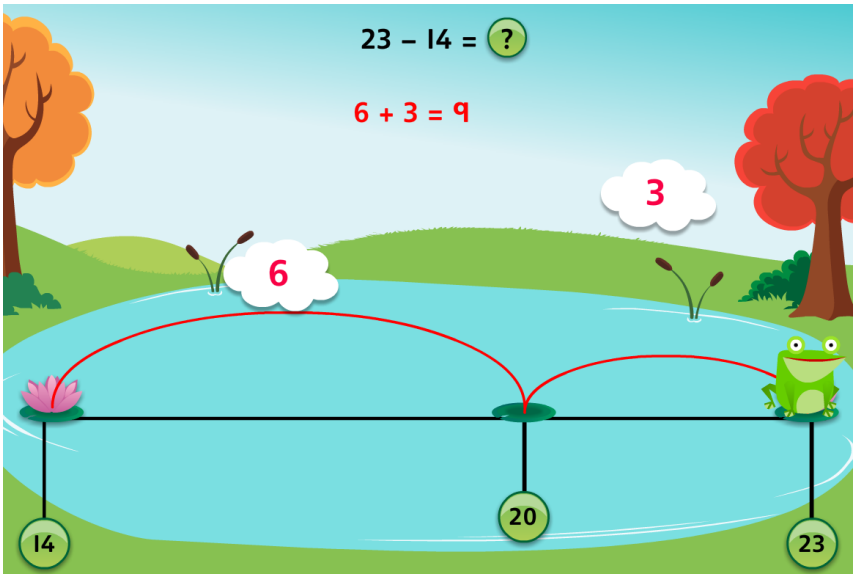
Subtract with 2-digit numbers

Subtract on a number line by **counting on**, aiming to develop mental subtraction skills.

This strategy will be used for:

Use Dienes blocks for subtraction calculations too.

2-digit numbers subtract ones (by taking away / counting on) e.g. 36—17
2-digit numbers subtract tens (by taking away / counting on) e.g. 48—30
Subtracting pairs of 2-digit numbers (see below):



Continue to revisit Y1 counting back when appropriate.

Teaching children to **bridge through ten** can help them to become more efficient, for example 42—25

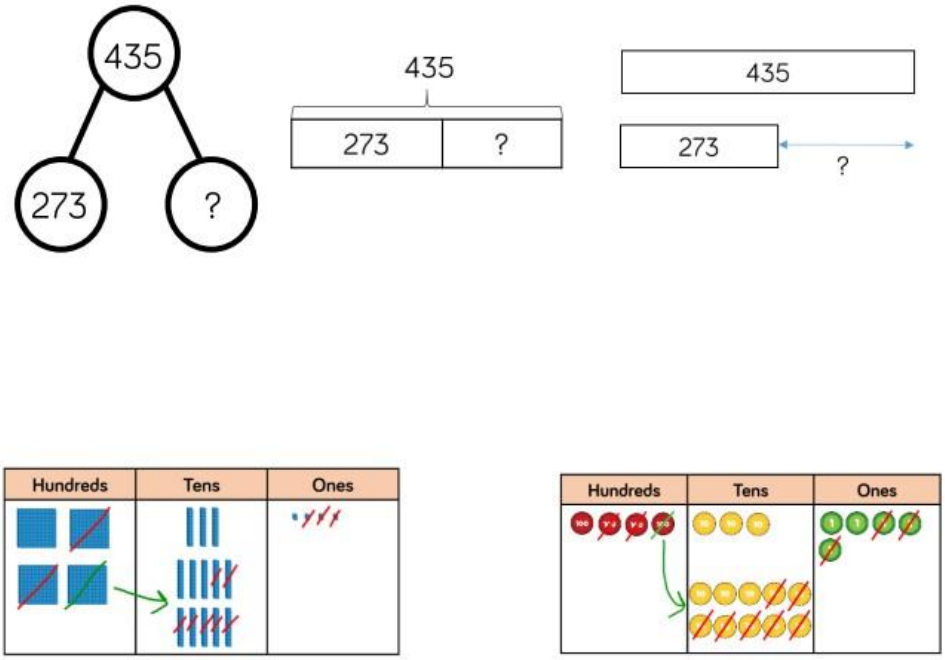
Mental strategy – subtract numbers close together by **counting on including bridging through 10:**

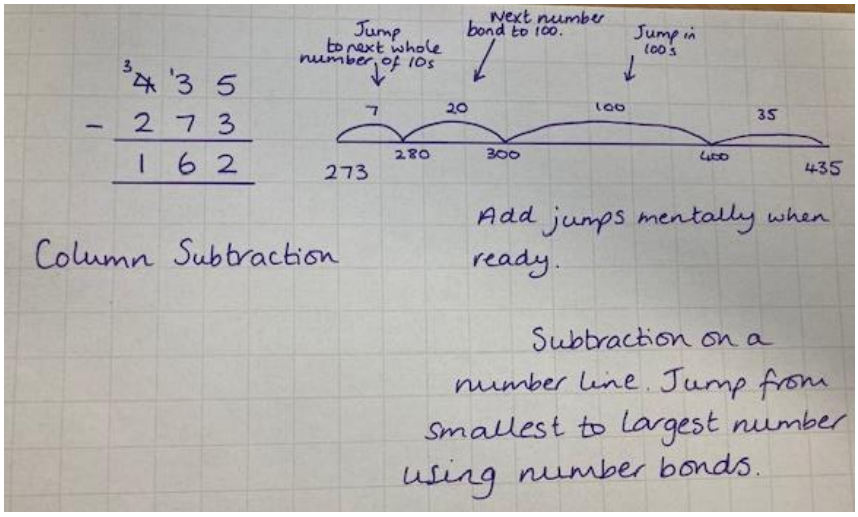
Many mental strategies are taught.

Children are taught to recognise that when numbers are close together, it is more efficient to **count on** the difference. They need to be clear about the relationship between addition and subtraction.

Subtraction

Y3

Skill: Subtract numbers with up to 3 digits	Year: 3
	Base 10 and place value counters are the most effective manipulative when subtracting numbers with up to 3 digits. Ensure children write out their calculation alongside any concrete resources so they can see the links to the written column method. Plain counters on a place value grid can also be used to support learning.



Key vocabulary: equal to, take, take away, less, minus, subtract, leaves, distance between, how many more, how many fewer / less than, most, least, count back, how many left, how much less is_?, difference, count on, strategy, partition, tens, exchange, decrease, hundreds, value, digit

Key skills for subtraction at Y3:

Subtract mentally a: **3-digit number and ones, 3-digit number and tens, 3-digit number and hundreds**
Estimate answers and use inverse operations to check
Solve problems, including missing number problems
Find 10 or 100 more or less than a given number
Recognise the place value of each digit in a 3-digit number
Counting up differences as a mental strategy when numbers are close together or near multiples of 10
Read and write numbers up to 1000 in numerals and words
Practise mental subtraction strategies, such as subtracting near multiples of 10 and adjusting (e.g. subtracting 19 or 21) and select most appropriate methods to subtract, explaining why; counting on, counting back

Subtraction

Y3

Subtract with 2- and 3-digit numbers

Introduce **partitioned column subtraction** method.

STEP 1: introduce this method with examples where **no exchanging** is required.

89 – 35 = 54

80 + 9
- 30 + 5
50 + 4

Emphasise that the **value hasn't changed**, we have just partitioned it in a different way.

STEP 2: introduce "exchanging" through practical subtraction. Make the larger number with Base 10, then subtract 47 from it.

72-47=

60
~~70~~ + 2
- 40 + 7
20 + 5 = **25**

Before subtracting '7' from the 72 blocks, they will need to exchange a row of 10 for ten units. Then subtract 7, and subtract 4 tens.

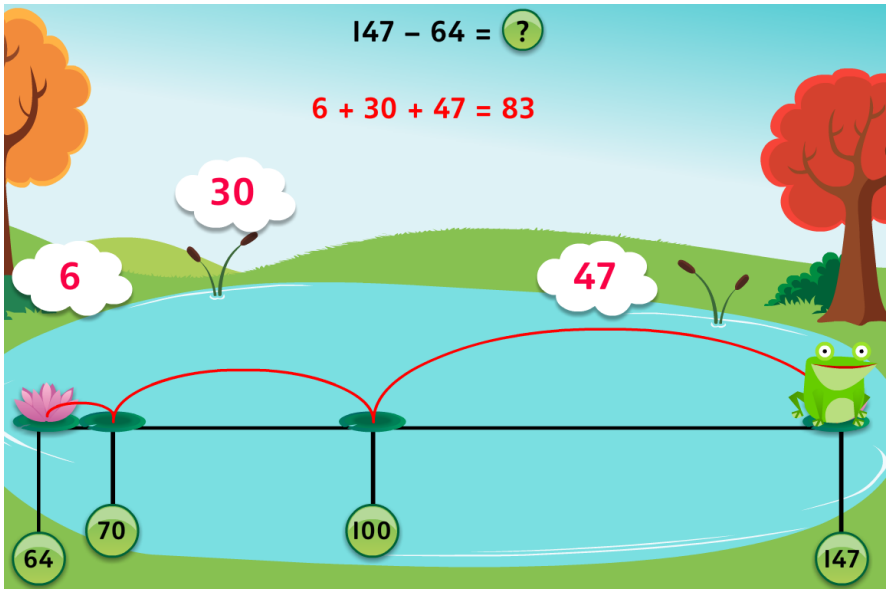
STEP 3: Once pupils are secure with the understanding of "exchanging", they can use the partitioned column method to subtract any 2 and 3-digit numbers.

2 3 8 - 1 4 6 = 9 2

100
~~200~~ + 1 30 + 8
- 1 0 0 + 4 0 + 6
0 + 9 0 + 2

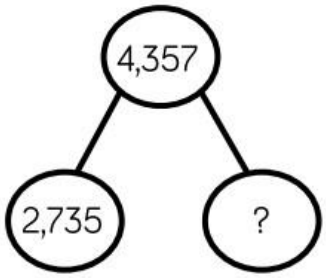
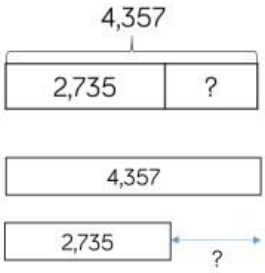
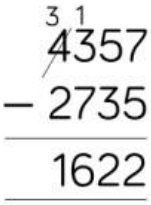
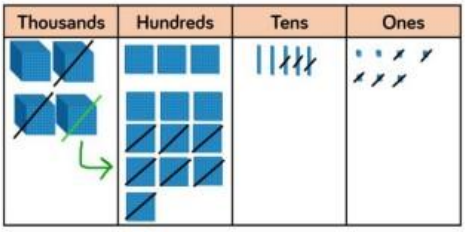
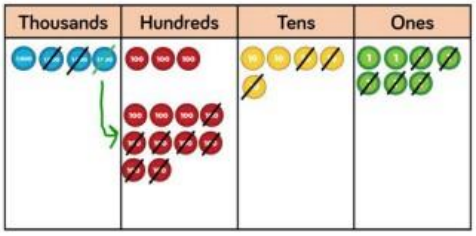
Subtracting money: partition into e.g. £1 + 30p + 8p

Use mental strategies of counting up using "Frog Jumps."



Subtraction

Y4

Skill: Subtract numbers with up to 4 digits	Year: 4
   **4,357 – 2,735 = 1,622**  	Base 10 and place value counters are the most effective manipulatives when subtracting numbers with up to 4 digits. Ensure children write out their calculation alongside any concrete resources so they can see the links to the written column method. Plain counters on a place value grid can also be used to support learning.

Key vocabulary: equal to, take, take away, less, minus, subtract, leaves, distance between, how many more, how many fewer / less than, most, least, count back, how many left, how much less is_? difference, count on, strategy, partition, tens, exchange, decrease, hundreds, thousands, value, digit, inverse

Key skills for subtraction at Y4:

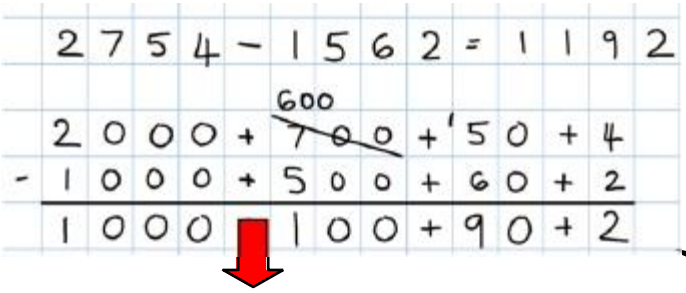
Subtract by counting on where numbers are close together or they are near to multiples of 10, 100 etc.
Select the most appropriate and efficient methods for given subtraction calculations
Estimate and use inverse operations to check answers
Solve addition and subtraction two-step problems, choosing which operations and methods to use and why
Solve simple measure and money problems involving fractions and decimals to two decimal places
Find 1000 more or less than a given number
Count backwards through zero, including negative numbers
Recognise place value of each digit in a 4-digit number
Round any number to the nearest 10, 100 or 1000
Solve number and practical problems that involve the above, with increasingly large positive numbers

Subtraction

Y4

Subtract with up to 4-digit numbers

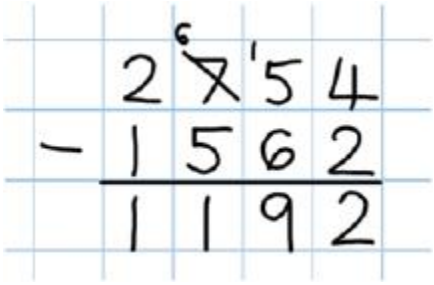
Partitioned column subtraction with "exchanging" (decomposition):



As introduced in Y3, but moving towards more complex numbers and values. Use **place value counters** to reinforce "exchanging".

Subtracting money: partition into £1 + 30 + 5 for example.

Compact column subtraction



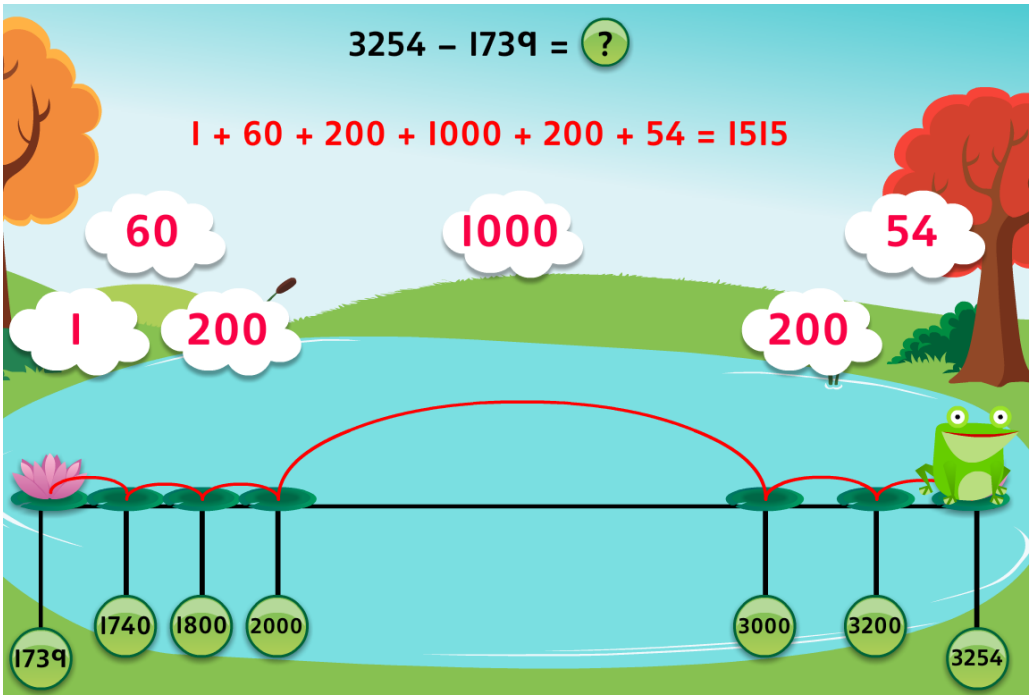
To introduce the compact method, ask children to perform a subtraction calculation with the familiar partitioned column subtraction then display the compact version for the calculation they have done. Ask pupils to consider how it relates to the method they know, what is similar and what is different, to develop an understanding of it.

Always encourage children to consider the best method for the numbers involved—mental, counting on, counting back or written method.

Give plenty of opportunities to apply this to money and measures.

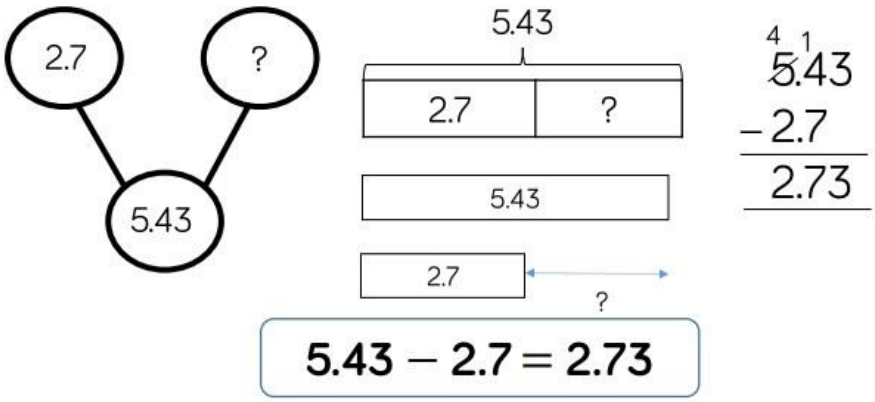
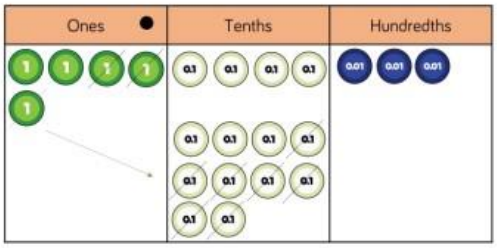
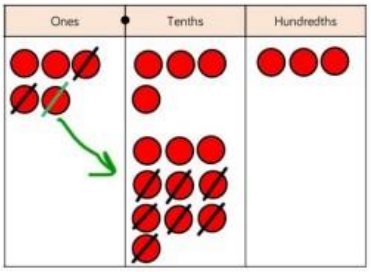
Mental strategies

Continue to use the "Frog Jumping" method.



Subtraction

Y5

Skill: Subtract with up to 3 decimal places	Year: 5
  	Place value counters and plain counters on a place value grid are the most effective manipulative when subtracting decimals with 1, 2 and then 3 decimal places. Ensure children have experience of subtracting decimals with a variety of decimal places. This includes putting this into context when subtracting money and other measures.

Subtract with increasingly large and more complex numbers and decimal values

Key vocabulary: distance between, how many more, how many fewer / less than, most, least, count back, how many left, how much less is_? difference, count on, strategy, partition, tens, ones, place value vocabulary to 1 million, exchange, decrease, hundreds, value, digit, inverse, tenths, hundredths, decimal point, decimal

Key skills for subtraction at Y6:

Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why

Read, write, order and compare numbers up to 10 million and determine the value of each digit

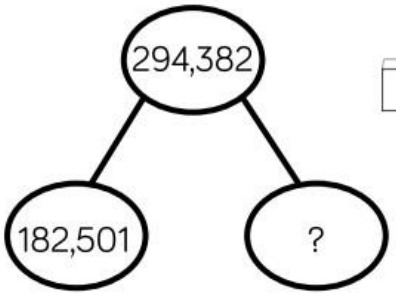
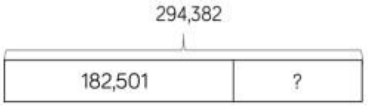
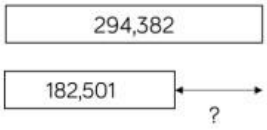
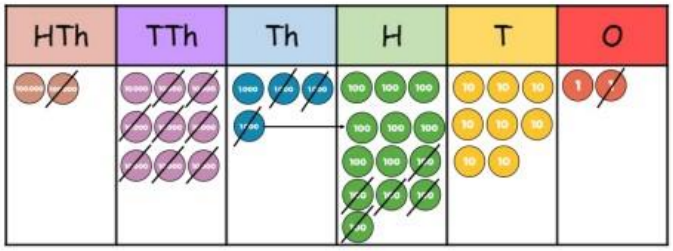
Round any whole number to a required degree of accuracy

Use negative numbers in context, and calculate intervals across zero

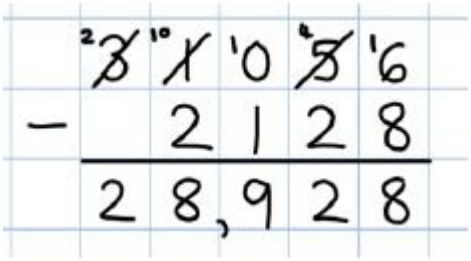
Children need to utilise and consider a range of mental subtraction strategies, jottings and written methods before choosing how to calculate

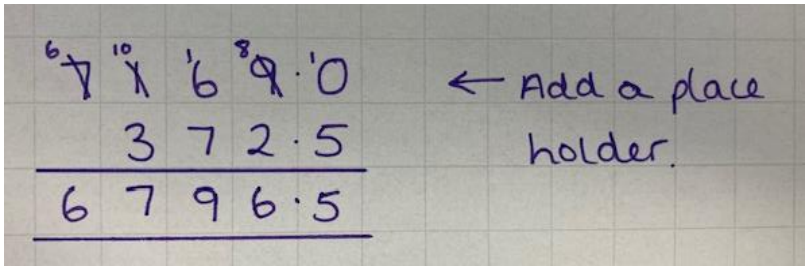
Subtraction

Y5/6

Skill: Subtract numbers with more than 4 digits	Year: 5/6
   **294,382 – 182,501 = 111,881** 	Place value counters or plain counters on a place value grid are the most effective concrete resource when subtracting numbers with more than 4 digits. At this stage, children should be encouraged to work in the abstract, using column method to subtract larger numbers efficiently.

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





Key vocabulary: many left, how much less is_? difference, count on, strategy, partition, tens, ones, place value vocabulary to hundreds of thousands, exchange, decrease, hundreds, value, digit, inverse, tenths, hundredths, decimal point, decimal

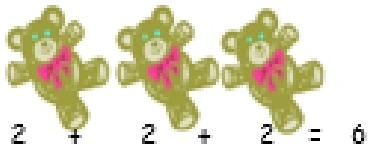
Key skills for subtraction at Y5:

Subtract numbers mentally with increasingly large numbers
Use rounding and estimation to check answers to calculations and determine, in a range of contexts, levels of accuracy
Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why
Read, write, order and compare numbers to at least 1 million and determine the value of each digit
Count forwards or backwards in steps of powers of 10 for any given number up to 1 million
Interpret negative numbers in context, counting forwards and backwards with positive and negative integers through 0
Round any number up to 1 million to the nearest 10, 100, 1000, 10 000 and 100 000

Multiplication

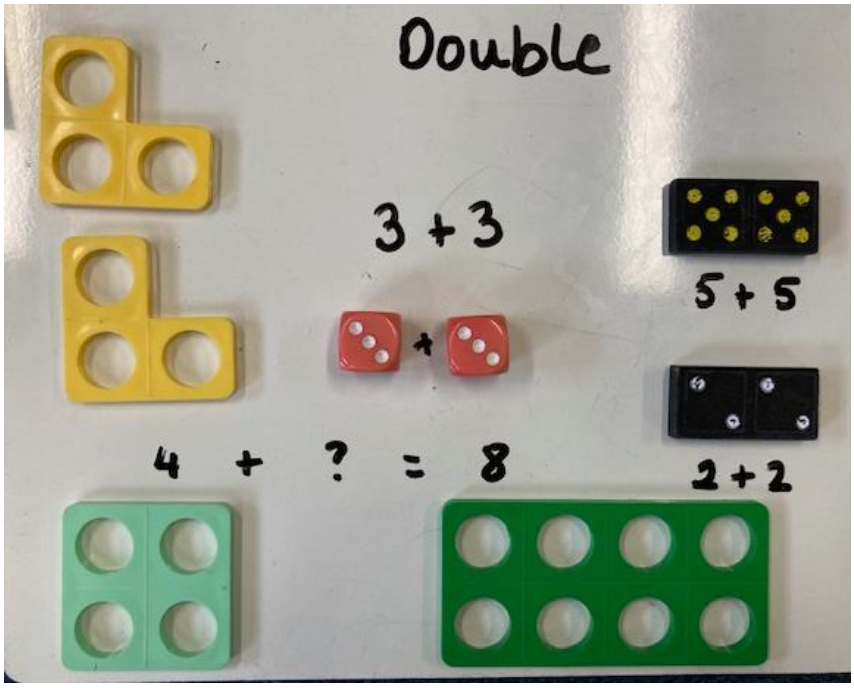
Reception

How many legs will 3 teddies have?



Children will engage in a wide variety of songs and rhymes, games and activities. In practical activities and through discussion they will begin to solve problems involving doubling.

'Three apples for you and three apples for me. How many apples altogether?'



Key vocabulary: groups of, lots of, times, altogether, count

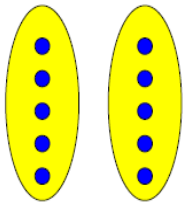
Key skills for multiplication in Reception:

- Count in multiples of 2, 5 and 10
- Solve one-step problems involving multiplication, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher
- Make connections between arrays, number patterns, and counting in twos, fives and tens
- Begin to understand doubling using concrete objects and pictorial representations

Multiplication

Y1

'Six pairs of socks.
How many socks altogether? 2, 4, 6, 8, 10, 12'



'2 groups of 5'

'How many altogether?'

'5 + 5 = 10'

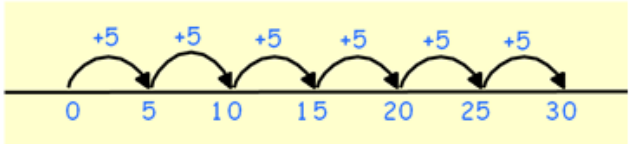
Double five is ten

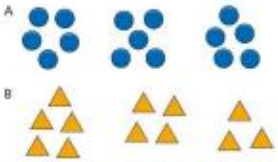
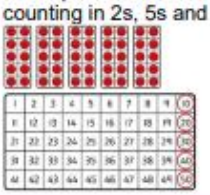
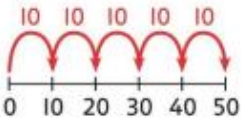
Use **arrays** to support early multiplication

'Three pots of ten crayons. How many crayons altogether? 10, 20, 30'

- Give children experience of counting equal group of objects in 2s, 5s and 10s.
- Present practical problem-solving activities involving counting equal sets or groups, as above.

Recognising multiplication as repeated addition
6 x 5 = 30



Year 1 Multiplication			
	Recognising and making equal groups Children arrange objects in equal and unequal groups and understand how to recognise whether they are equal. 	**Recognising and making equal groups** Children draw and represent equal and unequal groups.  	**Describe equal groups using words** *Three equal groups of 4.* *Four equal groups of 3.*
	Finding the total of equal groups by counting in 2s, 5s and 10s There are 5 pens in each pack … 5…10…15…20…25…30…35…40…	**Finding the total of equal groups by counting in 2s, 5s and 10s** 100 squares and ten frames support counting in 2s, 5s and 10s. 	**Finding the total of equal groups by counting in 2s, 5s and 10s** Use a number line to support repeated addition through counting in 2s, 5s and 10s. 

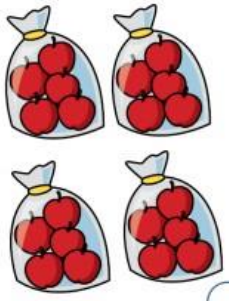
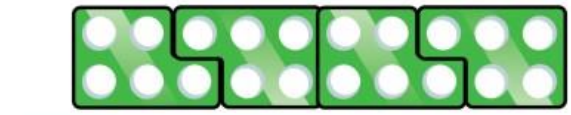
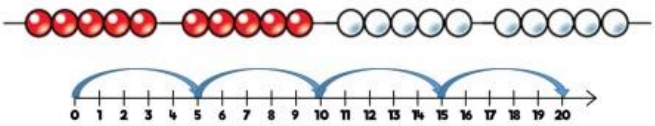
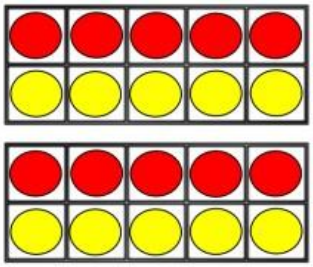
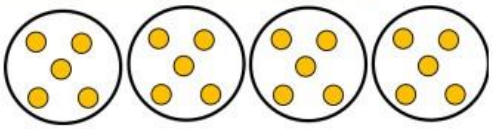
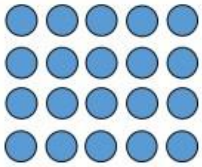
Key vocabulary: groups of, lots of, times, array, altogether, multiply, count

Key skills for multiplication at Y1:

- Count in multiples of 2, 5 and 10
- Solve one-step problems involving multiplication, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher
- Make connections between arrays, number patterns, and counting in twos, fives and tens
- Begin to understand doubling using concrete objects and pictorial representations

Multiplication

Y1/2

Skill: Solve 1-step problems using multiplication	Year: 1/2
   One bag holds 5 apples. How many apples do 4 bags hold?    $5 + 5 + 5 + 5 = 20$ $4 \times 5 = 20$ $5 \times 4 = 20$	Children represent multiplication as repeated addition in many different ways. In Year 1, children use concrete and pictorial representations to solve problems. They are not expected to record multiplication formally. In Year 2, children are introduced to the multiplication symbol.

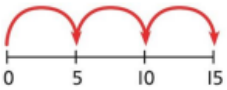
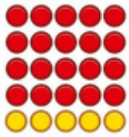
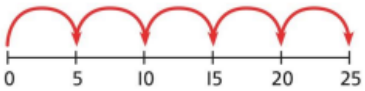
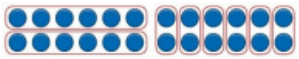
Key vocabulary: groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, sets of, equal groups, times as big as, once, twice, three times...

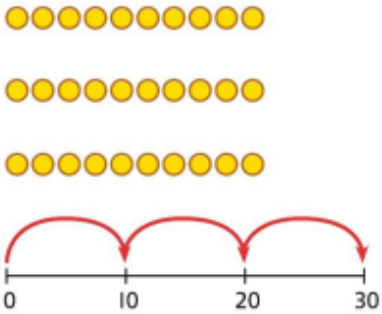
Key skills for multiplication at Y2:

- Count in steps of 2, 3 and 5 from zero, and in 10s from any number
- Recall and use multiplication facts from the **2, 5 and 10** multiplication and division tables, including recognising odds and evens
- Write and calculate number statements **using the x and = signs**
- Show that multiplication can be done in any order (commutative)
- Solve a range of problems involving multiplication, using concrete objects, arrays, repeated addition, mental methods, and multiplication facts
- Use a variety of language to discuss and describe multiplication

Multiplication

Y2

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

Learning ×2, ×5 and ×10 table facts	Develop an understanding of how to unitise groups of 2, 5 and 10 and learn corresponding times-table facts. *3 groups of 10 … 10, 20, 30* *3 × 10 = 30*	Understand how to relate counting in unitised groups and repeated addition with knowing key times-table facts.  *10 + 10 + 10 = 30* *3 × 10 = 30*

Multiplication

Multiply 2-digit numbers by single-digit numbers

Introduce partitioning method for multiplying 2-digit by single-digit numbers:

34 x 6=

30 x 6= 180

4 x 6= 24

204

To do this, children must be able to:
Partition numbers into tens and ones.

Multiply multiples of ten by a single digit (e.g. 20 x 4) using their knowledge of multiplication facts and place value.

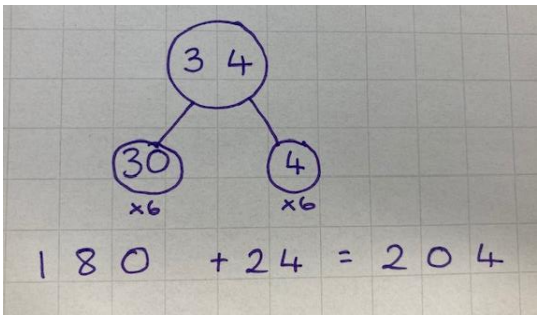
Recall and work out multiplication facts in the **2, 3, 4, 5, 8 and 10** times tables. Work out multiplication facts not known by repeated addition or other taught mental strategies (e.g. by commutative law, working out near multiples and adjusting, using doubling etc.). Strategies to support this are repeated addition using a number line, bead bars and arrays:

13 x 8 = 104

```
  13
 x  8
  24   (3 x 8)
 +80   (10 x 8)
 104
```

Use the language of place value to ensure understanding.

Include an addition symbol when adding partial products.

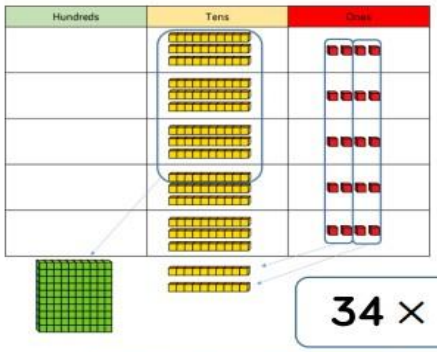
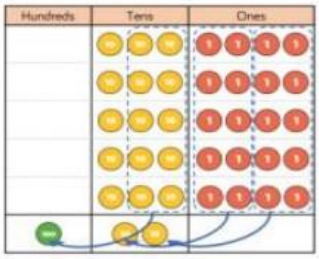


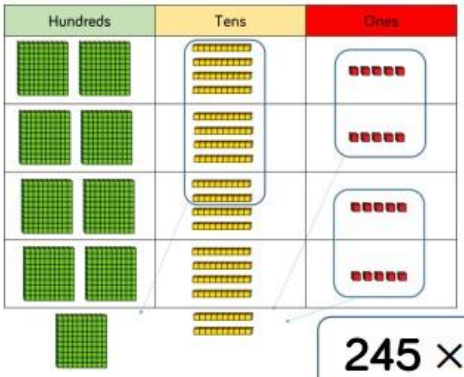
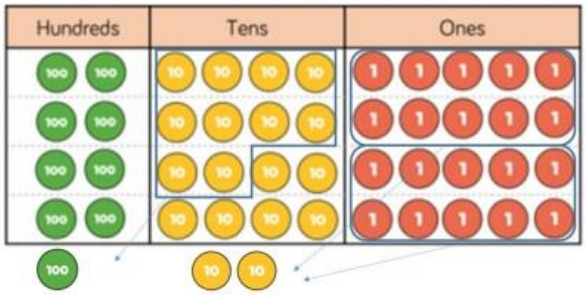
Key vocabulary: groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times, _times as big as, once, twice, three times..., partition, grid method, multiple, product, tens, ones, value

Key skills for multiplication:

Recall and use multiplication facts for the **2, 3, 4, 5, 8 and 10** multiplication tables, and multiply multiples of 10
Write and calculate number statements using the multiplication tables they know, including **2-digit x single-digit**, drawing upon mental methods, and progressing to reliable written methods
Solve multiplication problems, including missing number problems
Develop mental strategies using commutativity (e.g. 4 x 12 x 5 = 4 x 5 x 12 = 20 x 12 = 240)
Solve simple problems in contexts, deciding which operations and methods to use
Develop efficient mental methods to solve a range of problems e.g. ? x 5 = 20, 3 x ? = 18, ? x ? = 32

Multiplication

Skill: Multiply 2-digit numbers by 1-digit numbers	Year: 3/4
 H T O 3 4 × 5 2 0 (5 × 4) + 1 5 0 (5 × 30) 1 7 0 **34 × 5 = 170** H T O 3 4 × 5 1 7 0 1 2 	Teachers may decide to first look at the expanded column method before moving on to the short multiplication method. The place value counters should be used to support the understanding of the method rather than supporting the multiplication, as children should use times table knowledge.

Skill: Multiply 3-digit numbers by 1-digit numbers	Year: 3/4
 H T O 2 4 5 × 4 9 8 0 1 2 **245 × 4 = 980** 	When moving to 3-digit by 1-digit multiplication, encourage children to move towards the short, formal written method. Base 10 and place value counters continue to support the understanding of the written method. Limit the number of exchanges needed in the questions and move children away from resources when multiplying larger numbers.

Multiplication

Multiply 2- and 3-digit numbers by a single digit.

Recall all multiplication tables up to **12 x 12**

134 x 6=
100 x 6= 600
30 x 6= 180
4 x 6= 24
804

Move on to **short multiplication** if and when children are confident and accurate multiplying 2- and 3-digit numbers by a single digit this way, **and** are already confident in "carrying" for written addition.

36 x 4 = 144

```
   3 6
 x   4
 + 2 4   (4 x 6)
 1 2 0   (4 x 30)
 1 4 4
```

36 x 4 = 144

```
   3 6
 x 4
 1 4 4
   2
```

127 x 6 = 762

```
   1 2 7
 x     6
     4 2   (6x7)
 + 1 2 0   (6x20)
   6 0 0   (6x100)
   7 6 2
```

```
   1 2 7
 x     6
 7 6 2
 1   4
```

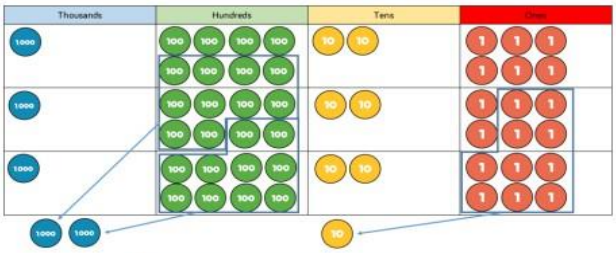
Choose an appropriate mental or written strategy:
When multiplying by 5, x10 then halve.
When multiplying by 4, double, then double again.

Key vocabulary: groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, array, column, row, commutative, groups of, sets of, lots of, equal groups, times, multiply, times as big as, once, twice, three times..., partition, grid method, total, multiple, product, sets of, inverse

Key skills for multiplication at Y4:

- Count in multiples of 6, 7, 9, 25 and 1000
- Recall multiplication facts for **all multiplication tables up to 12 x 12**
- Recognise place value of digits in up to 4-digit numbers
- Use place value, known facts and derived facts to multiply mentally, e.g. multiply by 1, 10, 100, by 0, or to multiply 3 numbers
- Use commutativity and other strategies mentally 3 x 6 = 6 x 3 , 2 x 6 x 5 = 10 x 6 , 39x7 = 30 x 7 + 9 x 7
- Solve problems with increasingly complex multiplication in a range of contexts
- Count in multiples of 6, 7, 9, 25 and 1000
- Recognise the place value of each digit in a 4-digit number (thousands, hundreds, tens, and ones)

Multiplication

Skill: Multiply 4-digit numbers by 1-digit numbers	Year: 5
 **1,826 × 3 = 5,478**	When multiplying 4-digit numbers, place value counters are the best manipulative to use to support children in their understanding of the formal written method. If children are multiplying larger numbers and struggling with their times tables, encourage the use of multiplication grids so children can focus on the use of the written method.

	Th	H	T	O
	1	8	2	6
×				3
	5	4	7	8
	2		1	

Skill: Multiply 2-digit numbers by 2-digit numbers	Year: 5
Use the most efficient method: 31x10= 310 31x20= 620 31 x 2= 62 620+62= 682 **22 × 31 = 682**	When multiplying a multi-digit number by 2-digits, use the area model to help children understand the size of the numbers they are using. This links to finding the area of a rectangle by finding the space covered by the Base 10. The grid method matches the area model as an initial written method before moving on to the formal written multiplication method.

	H	T	O
		2	2
×		3	1
		2	2
	6	6	0
	6	8	2

Key vocabulary: groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, _times as big as, once, twice, three times..., partition, grid method, total, multiple, product, inverse, square, factor, integer, decimal, short/long multiplication, "carry"

Key skills for multiplication at Y5:

Identify multiples and factors, using knowledge of **multiplication tables to 12x12**
Solve problems where larger numbers are decomposed into their factors
Multiply and divide integers and decimals by 10, 100 and 1000
Recognise and use square and cube numbers and their notation
Solve problems involving combinations of operations, choosing and using calculations and methods appropriately

Multiplication

Multiply up to 4-digit numbers by 1 or 2 digits

23 x 13 = 299

```
   2 3
 X 1 3
 + 6 9   (3 x 23)
 2 3 0   (10 x 23)
 2 9 9
```

Start with the ones, then the tens. Write the "carried" numbers smaller. When multiplying the tens, remember to put a place holder first. Emphasise the place value of each digit.

Th	H	T	O
	2	3	4
×		3	2
	4	6	8
$_1$7	$_1$0	2	0
7	4	8	8

56 x 27 = 1512

```
      5 6
   x  2 7
     3 9 4 2   (7x56)
 + 1 1 1 2 0   (20x56)
   1 5 1 2
     1
```

124 x 26 = 3224

```
     1 2 4
 X     2 6
     7 1 4 2 4   (6x124)
 + 2 4 8 0       (20x124)
   3 2 2 4
   1 1
```

Choose an appropriate mental or written strategy:
When multiplying by 5, x10 then halve.
When multiplying by 4, double, then double again.

Multiplication

Year 6 Short and long multiplication as in Y5, and multiply decimals with up to 2d.p by a single digit

Remind children that the single digit belongs in the ones column.

TTh	Th	H	T	O
	2	7	3	9
×			2	8
2 (2)	1 (5)	9 (3)	1 (7)	2
5 (1)	4	7 (1)	8	0
7	6	6	9	2

+

1

$2{,}739 \times 28 = 76{,}692$

Children will be able to:

- Use **short multiplication** (see Y5) to multiply numbers with **more than 4 digits by a single digit**; to multiply money and measures, and to **multiply decimals with up to 2d.p. by a single digit.**
- Use **long multiplication** (see Y5) to multiply numbers with **at least 4 digits by a 2 digit number.**

```
      5 3·2
  x   2 4·0
  ---------
    2 1 1 2·8    (53·2 x 4)
+ 1 0 6 4·0    (53·2 x 20)
  ---------
  1 2 7 6·8
```

Key vocabulary: groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, array, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times..., partition, grid method, total, multiple, product, inverse, square, factor, integer, decimal, short / long multiplication, "carry", tenths, hundredths, decimal

Key skills for multiplication at Y6:

Recall multiplication facts for all times tables up to **12 x 12 (as Y4 and Y5)**
Multiply multi-digit numbers, up to 4-digit x 2-digit using long multiplication
Perform mental calculations with mixed operations and large numbers
Solve multi-step problems in a range of contexts, choosing appropriate combinations of operations and methods
Estimate answers using rounding and approximation and determine levels of accuracy
Round any integer to a required degree of accuracy

Division

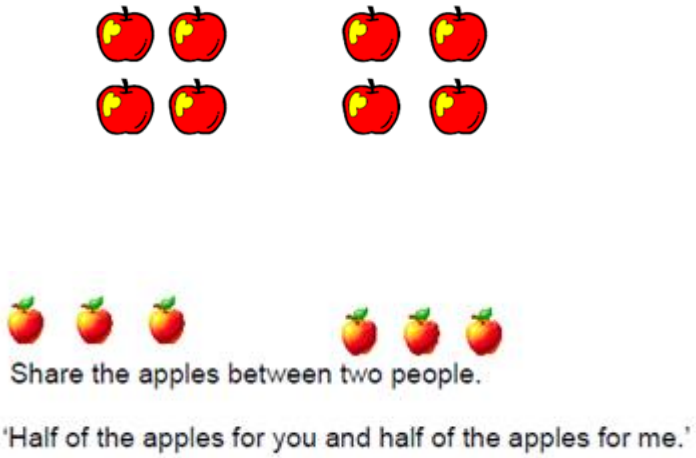
Group and share small quantities

Reception

Using songs, objects, diagrams and pictorial representations to solve problems involving **both grouping and sharing**.

Can you share 8 apples into **2 groups? How many will be in each group?**

Sharing:



Example division problem in a familiar context:

There are 2 pupils on this table and there are 10 pieces of fruit to share between us. If we share them equally, how many will we each get?

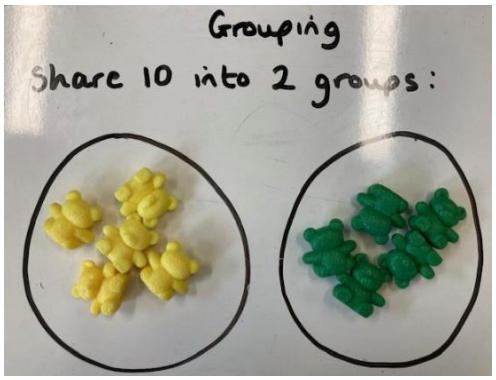
Can they work it out and give a division statement… ?

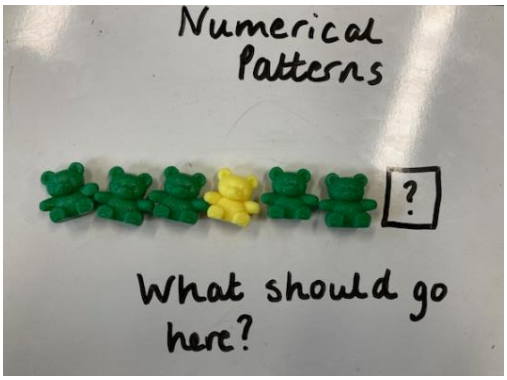
"10 shared between 2 people gives you 5 each."

Pupils should :

- Use lots of practical apparatus, arrays and picture representations.
- Be taught to understand "sharing" (Share these sweets between 2 people).

  Be introduced to count in multiples of 2s and 10s.
- Find **half** of a group of objects by sharing into 2 equal groups.





Key vocabulary: share, share equally, one each, two each…, group, groups of, lots of, deal, halve, half

Key number skills needed for division at the end of EYFS:

- Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations; arrays with the support of the teacher
- Through grouping and sharing small quantities, pupils begin to understand, division, and finding simple fractions of objects, numbers and quantities
- They make connections between objects, number patterns, and counting in twos, and tens
- Division activities may be taught through cooking and snack time, not necessarily in a Maths lesson

Division

Group <u>and</u> share small quantities

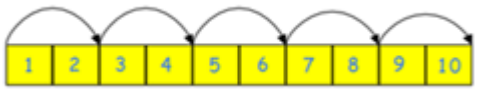
Y1

Using objects, diagrams and pictorial representations to solve problems involving **<u>both</u> grouping <u>and</u> sharing**.

How many groups of 4 can be made with 12 stars? = **3**

Grouping:

Sharing:



Pupils should:

Example division problem in a familiar context:

There are 6 pupils on this table and there are 18 pieces of fruit to share between us. If we share them equally, how many will we each get?

Can they work it out and give a division statement… ?

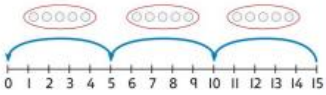
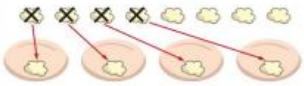
"18 shared between 6 people gives you 3 each."

Use lots of practical apparatus, arrays and picture representations.

Be taught to understand the difference between "grouping" objects (How many groups of 2 can you make?) and "sharing" (Share these sweets between 2 people).

Be able to count in multiples of 2s, 5s and 10s.

Find **half** of a group of objects by sharing into 2 equal groups.

Year 1 Division	Grouping Learn to make equal groups from a whole and find how many equal groups of a certain size can be made. Sort a whole set people and objects into equal groups. *There are 10 children altogether.* *There are 2 in each group.* *There are 5 groups.*	Grouping Represent a whole and work out how many equal groups. *There are 10 in total.* *There are 5 in each group.* *There are 2 groups.*	Grouping Children may relate this to counting back in steps of 2, 5 or 10. 
	Sharing Share a set of objects into equal parts and work out how many are in each part. 	Sharing Sketch or draw to represent sharing into equal parts. This may be related to fractions. 	Sharing *10 shared into 2 equal groups gives 5 in each group.*

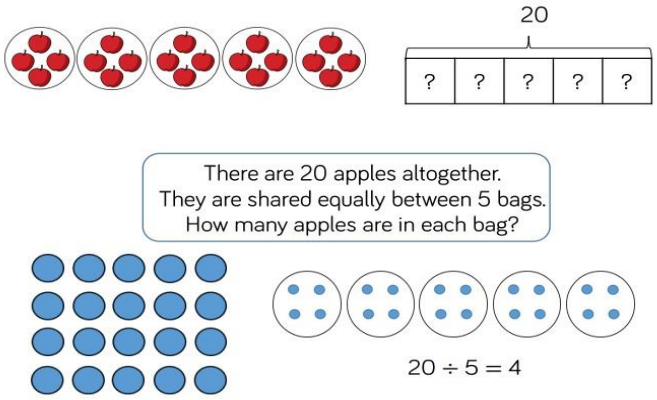
<u>Key vocabulary:</u> share, share equally, one each, two each…, group, groups of, lots of, array, halve, half

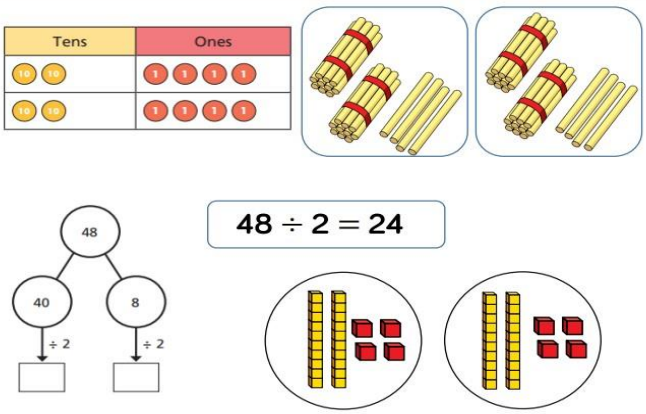
Key number skills needed for division at Y1:

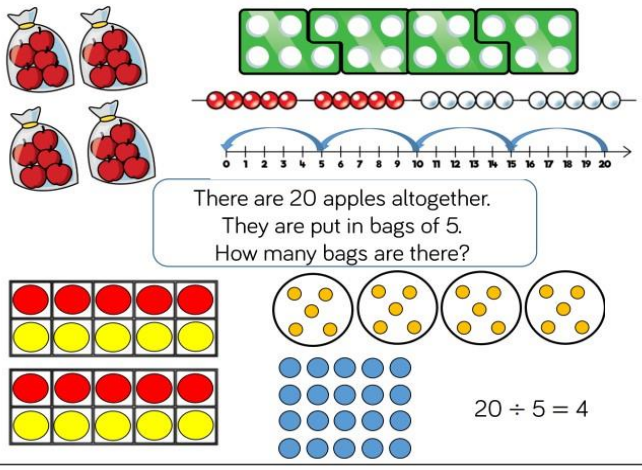
Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations; arrays with the support of the teacher
Through grouping and sharing small quantities, pupils begin to understand, division, and finding simple fractions of objects, numbers and quantities
Make connections between arrays, number patterns, and counting in twos, fives and tens

Division

Y1/2

Skill: Solve 1-step problems using multiplication (sharing)	Year: 1/2
	Children solve problems by sharing amounts into equal groups. In Year 1, children use concrete and pictorial representations to solve problems. They are not expected to record division formally. In Year 2, children are introduced to the division symbol.

Skill: Divide 2-digits by 1-digit (sharing with no exchange)	Year: 1/2
	When dividing larger numbers, children can use manipulatives that allow them to partition into tens and ones. Straws, Base 10 and place value counters can all be used to share numbers into equal groups. Part-whole models can provide children with a clear written method that matches the concrete representation.

Skill: Solve 1-step problems using division (grouping)	Year: 1/2
	Children solve problems by grouping and counting the number of groups. Grouping encourages children to count in multiples and links to repeated subtraction on a number line. They can use concrete representations in fixed groups such as number shapes which helps to show the link between multiplication and division.

Key vocabulary: share, share equally, one each, two each…, group, groups of, lots of, array, halve, half

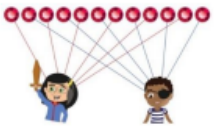
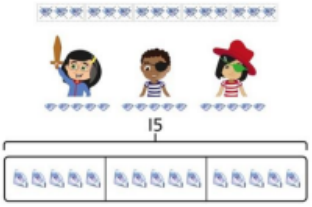
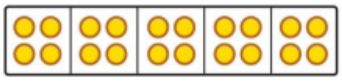
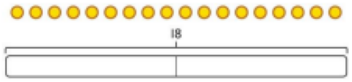
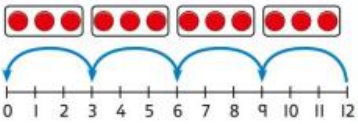
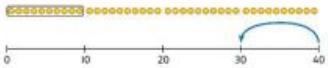
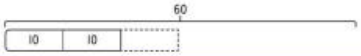
Key number skills needed for division at Y1:

Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations; arrays with the support of the teacher

Through grouping and sharing small quantities, pupils begin to understand, division, and finding simple fractions of objects, numbers and quantities

Make connections between arrays, number patterns, and counting in twos, fives and tens

Division

Year 2 Division	Concrete	Pictorial	Abstract
Sharing equally	Start with a whole and share into equal parts, one at a time.  *12 shared equally between 2.* *They get 6 each.* Start to understand how this also relates to grouping. To share equally between 3 people, take a group of 3 and give 1 to each person. Keep going until all the objects have been shared  They get 5 each. *15 shared equally between 3.* *They get 5 each.*	Represent the objects shared into equal parts using a bar model.  *20 shared into 5 equal parts.* *There are 4 in each part.*	Use a bar model to support understanding of the division.  *18 ÷ 2 = 9*
Grouping equally	Understand how to make equal groups from a whole. *8 divided into 4 equal groups.* *There are 2 in each group.*	Understand the relationship between grouping and the division statements. 12 ÷ 3 = 4 12 ÷ 4 = 3 12 ÷ 6 = 2 12 ÷ 2 = 6 	Understand how to relate division by grouping to repeated subtraction.  There are 4 groups now. *12 divided into groups of 3.* *12 ÷ 3 = 4* *There are 4 groups.*
Using known times-tables to solve divisions	Understand the relationship between multiplication facts and division. *4 groups of 5 cars is 20 cars in total.* *20 divided by 4 is 5.*	Link equal grouping with repeated subtraction and known times-table facts to support division.  *40 divided by 4 is 10.* Use a bar model to support understanding of the link between times-table knowledge and division.  	Relate times-table knowledge directly to division. 1 × 10 = 10 2 × 10 = 20 3 × 10 = 30 4 × 10 = 40 5 × 10 = 50 6 × 10 = 60 7 × 10 = 70 8 × 10 = 80 I used the 10 times-table to help me. 3 × 10 = 30. *I know that 3 groups of 10 makes 30, so I know that 30 divided by 10 is 3.* *3 × 10 = 30 so 30 ÷ 10 = 3*

Key vocabulary: share, share equally, one each, two each…, group, equal groups of, lots of, array, halve, half, divide, divided by, divided into, division, grouping, number line, left, left over

Key number skills needed for division at Y2:

Count in steps of 2, 3, 5 and 10 from 0

Recall and use multiplication and division facts for the **2, 5 and 10** multiplication tables, including recognising odd and even numbers

Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the **x, ÷ and** = signs

Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot

Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts

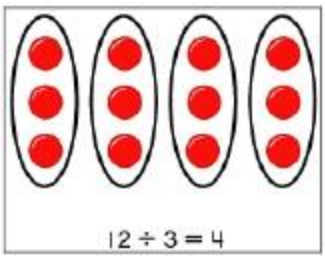
Division

Y2

Group and share, using the ÷ and = sign

Use objects, arrays, diagrams and pictorial representations, and grouping on a number line.

Arrays:

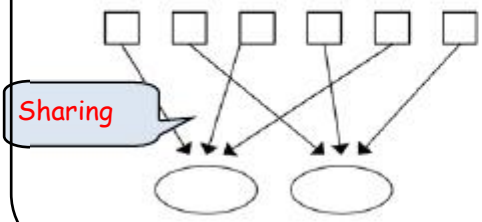


This represents **12 ÷ 3, posed as** how many groups of 3 are in 12?

Pupils should also show that the same array can represent **12 ÷ 4 = 3** if grouped horizontally.

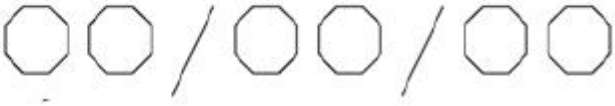
Know and understand sharing and grouping:

6 sweets shared between 2 people, how many do they each get?



Grouping

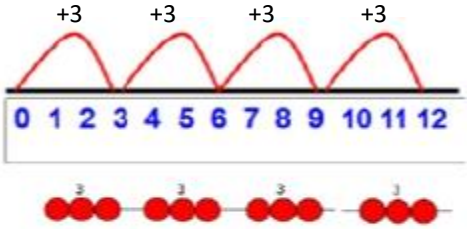
There are 6 sweets, how many people can have 2 sweets each?



Children should be taught to recognise whether problems require sharing or grouping.

Grouping using a number line:

Group from zero in equal jumps of the divisor to find out "how many groups of _ in _ ?". Pupils could add using a bead string or practical apparatus to work out problems like "A CD costs £3. How many CDs can I buy with £12?" **This is an important method to develop understanding of division as grouping.**



12 ÷ 3 = 4

12 ÷ 3 as "**How many groups of 3 are in 12?**"

Key vocabulary: share, share equally, one each, two each…, group, equal groups of, lots of, array, halve, half, divide, divided by, divided into, division, grouping, number line, left, left over

Key number skills needed for division at Y2:

Count in steps of 2, 3, 5 and 10 from 0

Recall and use multiplication and division facts for the **2, 5 and 10** multiplication tables, including recognising odd and even numbers

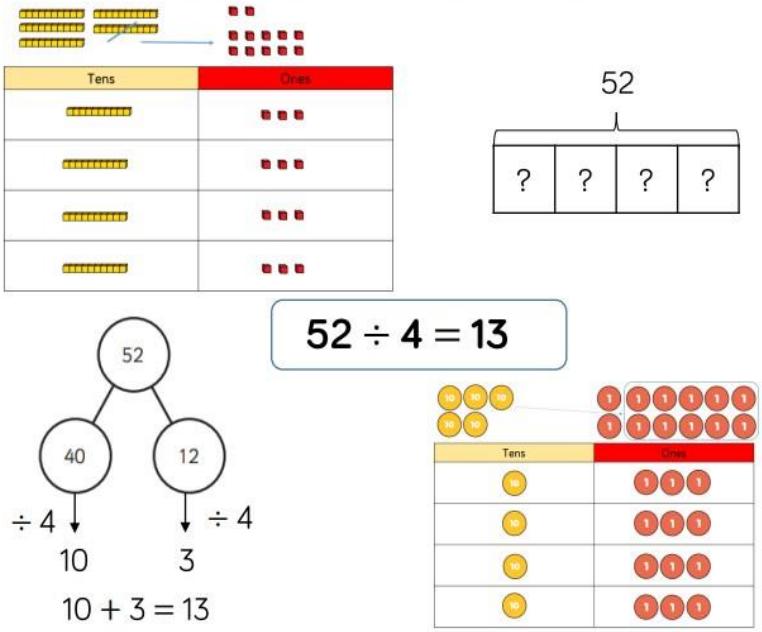
Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the **x, ÷ and** = signs

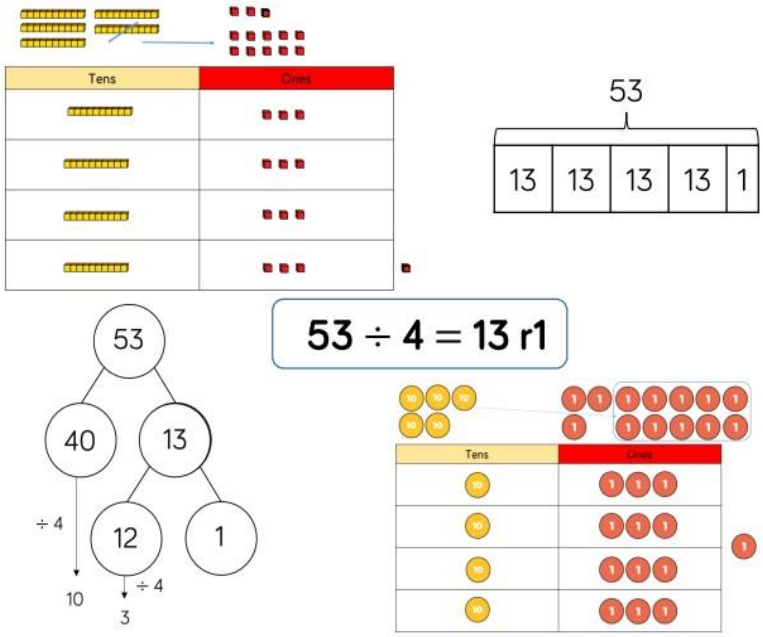
Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot

Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts

Division

Y3/4

Skill: Divide 2-digits by 1-digit (sharing with exchange)	Year: 3/4
	When dividing numbers involving an exchange, children can use Base 10 and place value counters to exchange one ten for ten ones. Children should start with the equipment outside the place value grid before sharing the tens and ones equally between the rows. Flexible partitioning in a part-whole model supports this method.

Skill: Divide 2-digits by 1-digit (sharing with remainders)	Year: 3/4
	When dividing numbers with remainders, children can use Base 10 and place value counters to exchange one ten for ten ones. Starting with the equipment outside the place value grid will highlight remainders, as they will be left outside the grid once the equal groups have been made. Flexible partitioning in a part-whole model supports this method.

<u>Key vocabulary</u>: share, share equally, one each, two each…, group, equal groups of, lots of, array, halve, half, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, 'carry', remainder, multiple

Key number skills needed for division at Y3:

Recall and use multiplication and division facts for the 2–10 multiplication tables (through doubling, connect the 2, 4 and 8s)

Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for 2-digit numbers times 1-digit numbers, using mental and progressing to formal written methods

Solve problems, in contexts, and including missing number problems, involving multiplication and division

Develop efficient mental methods, for example, using multiplication and division facts (e.g. using 3 × 2 = 6, 6 ÷ 3 = 2 and 2 = 6 ÷ 3) to derive related facts (30 × 2 = 60, so 60 ÷ 3 = 20 and 20 = 60 ÷ 3)

Develop reliable written methods for division, starting with calculations of 2-digit numbers by 1-digit numbers and progressing to the formal written method of short division

Division

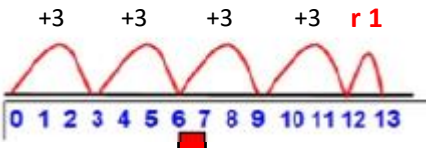
Y3

Divide 2-digit numbers by a single digit (where there is no remainder in the final answer)

Ensure number sentence is written out fully first before drawing it out as a 'Bus Stop'.

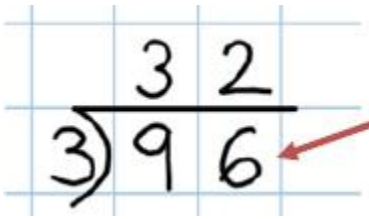
Grouping on a number line:

13 ÷ 3 = 4 r 1

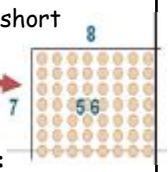


STEP 1: Children continue to work out unknown division facts by grouping on a number line from zero. They are also now taught the concept of **remainders**, as in the example. This should be introduced practically and with arrays, as well as being translated to a number line. Children should work towards calculating some basic division facts with remainders mentally for the 2s, 3s, 4s, 5s, 8s and 10s, ready for "carrying" remainders across within the short division method.

Short division: Limit numbers to NO remainders in the answer OR carried (each digit must be a multiple of the divisor).



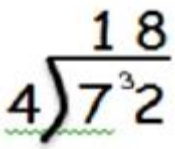
STEP 2: Once children are secure with division as grouping and demonstrate this using number lines, arrays etc., **short division** for larger 2-digit numbers should be introduced, initially with carefully selected examples requiring no calculating of remainders at all. Start by introducing the layout of short division by comparing it to an array.



Remind children of correct place value, that 96 is equal to 90 and 6, but in short division, pose:

- How many 3s in 9? = 3, and record it above the **9 tens**.
- How many 3s in 6? = 2, and record it above the **6 ones**.

Short division: Limit numbers to NO remainders in the final answer, but with remainders occurring when ready.



STEP 3: Once children demonstrate a full understanding of remainders, and also the short division method taught, they can be taught how to use the method when remainders occur within the calculation (e.g. 96 ÷ 4), and be taught to "carry" the remainder on to the next digit. **If needed, children should use the number line to work out individual division facts that occur which they are not yet able to recall mentally.**

Step 3 Only taught when pupils can calculate '**remainders**'.

Real life contexts need to be used routinely to help pupils gain a full understanding, and the ability to recognise the place of division and how to apply it to problems.

Key vocabulary: share, share equally, one each, two each…, group, equal groups of, lots of, array, deal, halve, half, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, 'carry', remainder, multiple

Key number skills needed for division at Y3:

- Recall and use multiplication and division facts for the 2–10 multiplication tables (through doubling, connect the 2, 4 and 8s)
- Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for 2-digit numbers times 1-digit numbers, using mental and progressing to formal written methods
- Solve problems, in contexts, and including missing number problems, involving multiplication and division
- Develop efficient mental methods, for example, using multiplication and division facts (e.g. using 3 × 2 = 6, 6 ÷ 3 = 2 and 2 = 6 ÷ 3) to derive related facts (30 × 2 = 60, so 60 ÷ 3 = 20 and 20 = 60 ÷ 3)
- Develop reliable written methods for division, starting with calculations of 2-digit numbers by 1-digit numbers and progressing to the formal written method of short division

Division

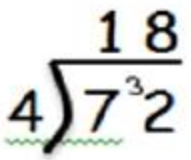
Y4

Divide up to 3-digit numbers by a single digit

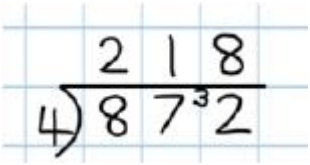
(without remainders initially)

Continue to develop short division:

Short division should only be taught once children have secured the skill of calculating "remainders".

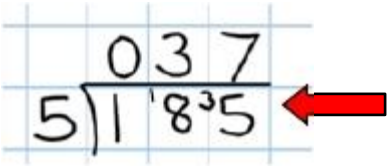


STEP 1: Pupils must be secure with the process of short division for dividing 2-digit numbers by a single digit (**those that do not result in a final remainder** —see steps in Y3), but must understand how to calculate remainders, using this to "carry" remainders within the calculation process (see example).



STEP 2: Pupils move on to dividing numbers with up to **3-digits** by a single digit; however, problems and calculations provided should **not result in a final answer with remainder** at this stage. Children who exceed this expectation may progress to Y5 level.

Real life contexts need to be used routinely to help pupils gain a full understand-ing, and the ability to recognise the place of division and how to apply it to problems.



When the answer for the **first column** is zero (1 ÷ 5, as in example), children could initially write a zero above to acknowledge its place, and must always "carry" the number (1) over to the next digit as a remainder.

Include money and measure contexts when confident.

Key vocabulary: share, share equally, one each, two each…, group, equal groups of, lots of, array, deal, halve, half divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, "carry", remainder, multiple, divisible by, factor

Key number skills needed for division at Y4:

Recall multiplication and division facts for all numbers up to 12 x 12

Use place value, known and derived facts to multiply and divide mentally, including: multiplying and dividing by 10 and 100 and 1

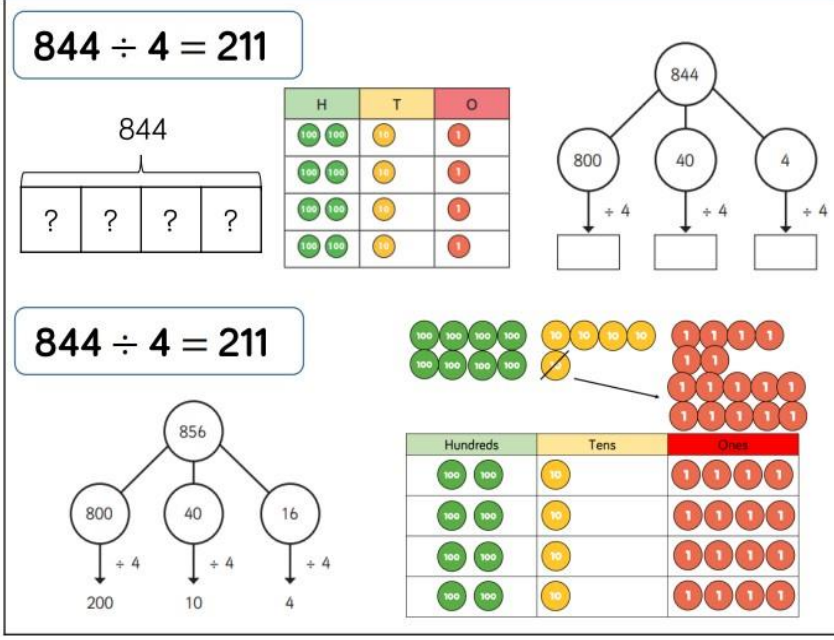
Pupils practise to become fluent in the formal written method of short division with exact answers when dividing by a 1-digit number

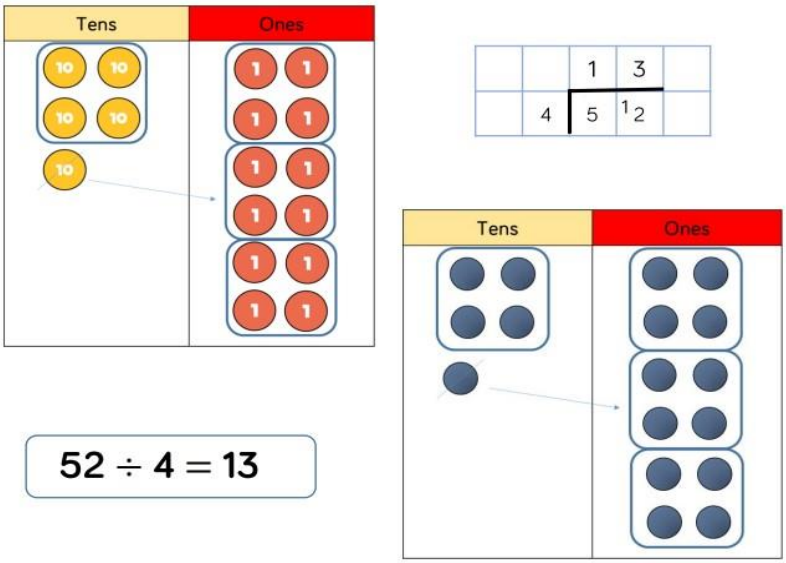
Pupils practise mental methods and extend this to 3-digit numbers to derive facts, e.g. 200 × 3 = 600 so 600 ÷ 3 = 200

Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly hard numbers. This should include correspondence questions such as three cakes shared equally between 10 children

Division

Y4

Skill: Divide 3-digits by 1-digit (sharing)	Year: 4
	Children can continue to use place value counters to share 3-digit numbers into equal groups. Children should start with the equipment outside the place value grid before sharing the hundreds, tens and ones equally between the rows. This method can also help to highlight remainders. Flexible partitioning in a part-whole model supports this method.

Skill: Divide 2-digits by 1-digit (grouping)	Year: 4/5
	When using the short division method, children use grouping. Starting with the largest place value, they group by the divisor. Language is important here. Children should consider 'How many groups of 4 tens can we make?' and 'How many groups of 4 ones can we make?' Remainders can also be seen as they are left ungrouped.

Key vocabulary: share, share equally, one each, two each…, group, equal groups of, lots of, array, deal, halve, half divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, "carry", remainder, multiple, divisible by, factor

Key number skills needed for division at Y4:

Recall multiplication and division facts for all numbers up to 12 x 12

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 1-digit number

Pupils practise mental methods and extend this to 3-digit numbers to derive facts, e.g. 200 × 3 = 600 so 600 ÷ 3 = 200

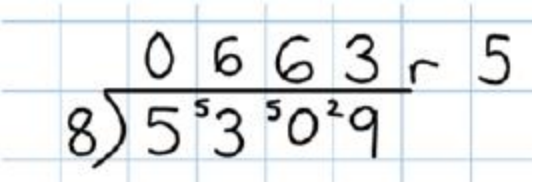
Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly hard numbers. This should include correspondence questions such as three cakes shared equally between 10 children

Division

Y5

Divide up to 4 digits by a single digit, including those with remainders

Short division, including remainder answers:



Short division with remainders: Now that pupils are introduced to examples that give rise to remainder answers, division needs to have a real-life problem-solving context, where **pupils consider the meaning of the remainder and how to express it,** i.e. as a fraction, a decimal, or as a rounded number or value , depending upon the context of the problem.

The answer to 5309 ÷ 8 could be expressed as 663 and five eighths, 663 r 5, as a decimal, or rounded as appropriate to the problem involved.

See Y6 for how to continue the short division to give a decimal answer for children who are confident.

Include money and measure contexts.

8 Times Table
1-8
2-16
3-24
4-32
5-40
6-48
7-56
8-64
9-72
10-80

If children are confident and accurate:

- Introduce **long division** for pupils who are ready to divide any number by a 2-digit number (e.g. 2678 ÷ 19). This is a Year 6 expectation.

Times table written down to aid calculation.

Key vocabulary: share, share equally, one each, two each…, group, equal groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, short division, deal, halve, half, "carry", remainder, multiple, divisible by, factor, inverse, quotient, prime number, prime factors, composite number (non-prime)

Key number skills needed for division at Y5:

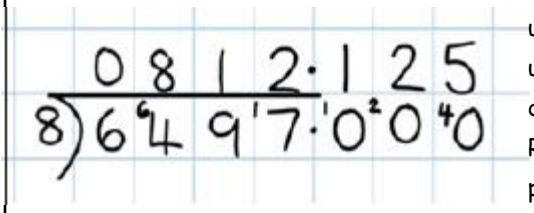
Recall multiplication and division facts for all numbers up to 12 x 12 (as in Y4)
Multiply and divide numbers mentally, drawing upon known facts
Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
Solve problems involving multiplication and division where larger numbers are decomposed into their factors
Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
Use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers
Work out whether a number up to 100 is prime, and recall prime numbers to 19
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
Use multiplication and division as inverses
Interpret non-integer answers to division by expressing results in different ways according to the context, including with remainders, as fractions, as decimals or by rounding (e.g. 98 ÷ 4 = 24 r 2 = 24 1/2 = 24.5)
Solve problems involving combinations of all four operations, including understanding of the equals sign, and including division for scaling by different fractions and problems involving simple rates

Division

Y6

Divide at least 4 digits by both single-digit and 2-digit numbers (including decimal numbers and quantities)

Short division, for dividing by a single digit: e.g. 6497 ÷ 8

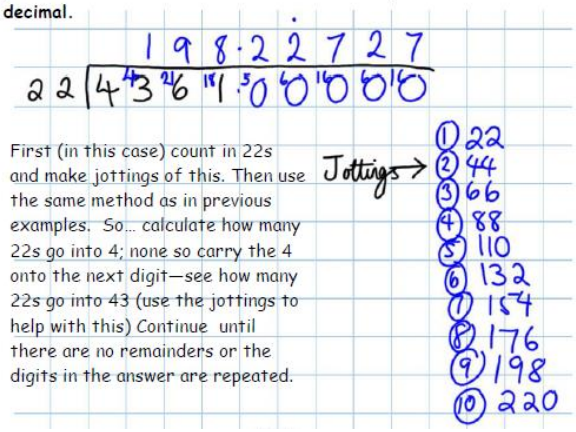


Short division with remainders: Pupils should continue to use this method, but with numbers to at least 4 digits, and understand how to express remainders as fractions, decimals, whole number remainders, or rounded numbers. Real-life problem-solving contexts need to be the starting point, where pupils have to consider the most appropriate way to express the remainder.

Calculating a decimal remainder: In this example, rather than expressing the remainder as **r 1**, a decimal point is added after the units because there is still a remainder, and the one remainder is carried on to zeros after the decimal point (to show there was no decimal value in the original number). Keep dividing to an appropriate degree of accuracy for the problem being solved.

Introduce long division for dividing by 2 digits.

'Bus Stop' method dividing three or four digit numbers by two digit numbers with decimals with two decimal places. Answer as a decimal.



First (in this case) count in 22s and make jottings of this. Then use the same method as in previous examples. So... calculate how many 22s go into 4; none so carry the 4 onto the next digit—see how many 22s go into 43 (use the jottings to help with this) Continue until there are no remainders or the digits in the answer are repeated.

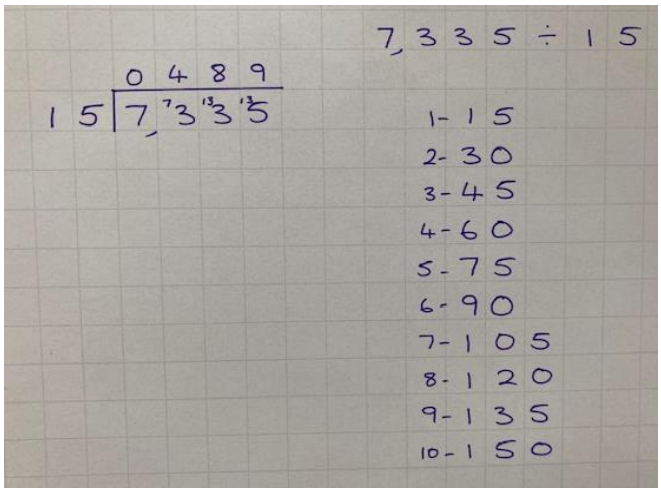
Where **remainders** occur, pupils should express them as fractions, decimals or use rounding, depending upon the problem.

Key vocabulary: share, share equally, one each, two each..., group, equal groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, short division, deal, halve, half, "carry", remainder, multiple, divisible by, factor, inverse, quotient, prime number, prime factors, composite number (non-prime), common factor

Key number skills needed for division at Y6:

- Recall and use multiplication and division facts for all numbers to 12 x 12 for more complex calculations
- Divide numbers up to 4 digits by a 2-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. Use short division where appropriate
- Perform mental calculations, including with mixed operations and large numbers
- Identify common factors, common multiples and prime numbers
- Solve problems involving all 4 operations
- Use estimation to check answers to calculations and determine accuracy, in the context of a problem
- Use written division methods in cases where the answer has up to two decimal places
- Solve problems which require answers to be rounded to specified degrees of accuracy

Division

Skill: Divide multi digits by 2-digits (short division)	Year: 6
	When children begin to divide up to 4-digits by 2-digits, written methods become the most accurate as concrete and pictorial representations become less effective. Children can write out multiples to support their calculations with larger remainders. Children will also solve problems with remainders where the quotient can be rounded as appropriate.

Skill: Divide multi-digits by 2-digits (long division)

Year: 6

		0	3	6
1	2	4	3	2
	–	3	6	0
			7	2
	–		7	2
				0

(×30)

(×6)

$12 \times 1 = 12$
$12 \times 2 = 24$
$12 \times 3 = 36$
$12 \times 4 = 48$
$12 \times 5 = 60$
$12 \times 6 = 72$
$12 \times 7 = 84$
$12 \times 8 = 96$
$12 \times 7 = 108$
$12 \times 10 = 120$

$432 \div 12 = 36$

$7{,}335 \div 15 = 489$

	0	4	8	9
15	7	3	3	5
–	6	0	0	0
	1	3	3	5
–	1	2	0	0
		1	3	5
–		1	3	5
				0

(×400

(×80)

(×9)

$1 \times 15 = 15$
$2 \times 15 = 30$
$3 \times 15 = 45$
$4 \times 15 = 60$
$5 \times 15 = 75$
$10 \times 15 = 150$

Children can also divide by 2-digit numbers using long division.

Children can write out multiples to support their calculations with larger remainders.

Children will also solve problems with remainders where the quotient can be rounded as appropriate.

Skill: Divide multi digits by 2-digits (long division)

Year: 6

$372 \div 15 = 24$ r12

			2	4	r	1	2
1	5	3	7	2			
	–	3	0	0			
			7	2			
	–		6	0			
			1	2			

$1 \times 15 = 15$
$2 \times 15 = 30$
$3 \times 15 = 45$
$4 \times 15 = 60$
$5 \times 15 = 75$
$10 \times 15 = 150$

			2	4	$\frac{4}{5}$
1	5	3	7	2	
	–	3	0	0	
			7	2	
	–		6	0	
			1	2	

$372 \div 15 = 24\frac{4}{5}$

When a remainder is left at the end of a calculation, children can either leave it as a remainder or convert it to a fraction.
This will depend on the context of the question.

Children can also answer questions where the quotient needs to be rounded according to the context.

Division

Alternative Long division method for Y6:

Long division – an alternative approach

```
15 | 8 6 4 0
```

15 into 8 doesn't go, so look at the next digit.

```
      5
15 | 8 6 4 0
   - 7 5
     1 1
```

15 goes into 86 five times, so put a 5 above the 6.
15 x 5 = 75

Take that 75 away from the 86 to get your remainder.
86 – 75 = 11

```
      5 7
15 | 8 6 4 0
     7 5
     1 1 4
   - 1 0 5
         9
```

Next, carry the 4 down to make 114.

15 goes into 114 seven times, so put a 7 above the 4.
15 x 7 = 105

Take 105 from the 114 to get your remainder
114 – 105 = 9

```
      5 7 6
15 | 8 6 4 0
     7 5
     1 1 4
   - 1 0 5
         9 0
```

Carry the 0 down to make 90

15 goes into 90 exactly 6 times, so put a 6 above the 0

15 x 6 = 90

8,640 ÷ 15 = 576

RANBY HOUSE PREP SCHOOL
STAND OUT FROM THE CROWD

Thank you for reading our guide. We hope you have found it useful.

RANBY HOUSE

If you require further information, please do not hesitate to contact your child's maths teacher, or our mathematics subject leader via the school reception. Thank you.

Email: officeprep@wsnl.co.uk Tel: 01777 703138

Website: www.wsnl.co.uk/prep

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