Calculation Policy

The following pages show the progression in calculation (addition, subtraction, multiplication and division) and how this works in line with the National Curriculum. The consistent use of the CPA (concrete, pictorial, abstract) approach across the curriculum helps children develop understanding across all the operations in an efficient and reliable way. This policy shows how these methods develop children's confidence in their understanding of both written and mental methods. Early learning in number and calculation in Year 1 is designed to build on progressively from the content and methods established in Early Years Foundation Stage.

Updated January 2024

Key Stage 1

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

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

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

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

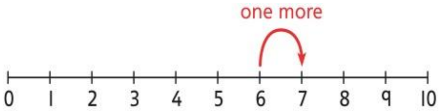
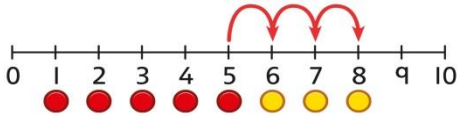
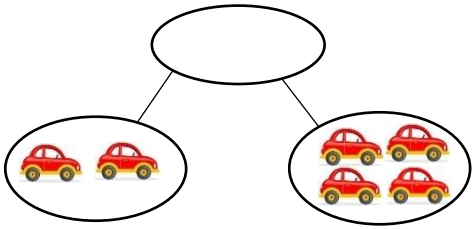
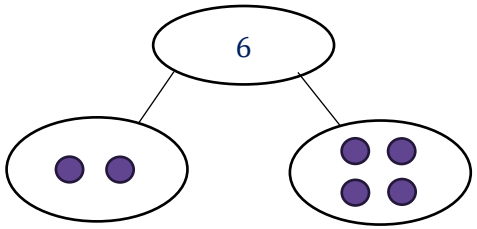
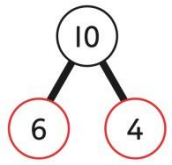
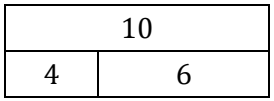
In Year 2, they will start to see calculations presented in a column format. Although this is not expected to be formalised until KS2, the children are introduced to the column method at the end of Year 2.

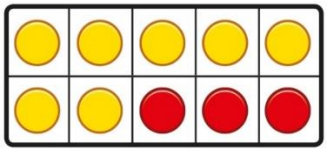
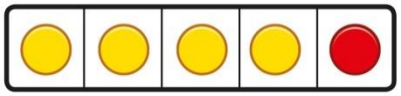
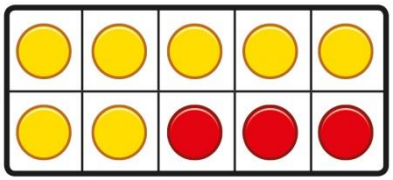
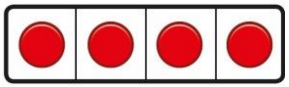
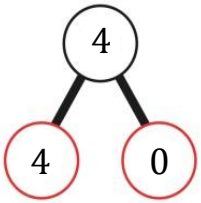
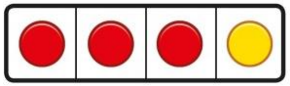
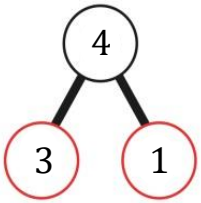
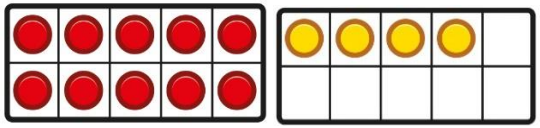
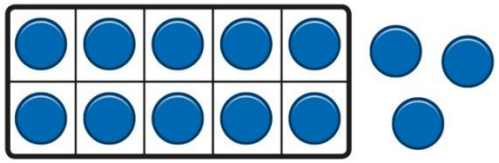
Multiplication and division: Children develop an awareness of equal groups and link this with counting in equal steps, starting with 2s, 5s and 10s. At the end of Year 1 and throughout Year 2, they learn to connect the language of equal groups with the mathematical symbols for multiplication and division. They learn how multiplication and division can be related to repeated addition and repeated subtraction to find the answer to the calculation.

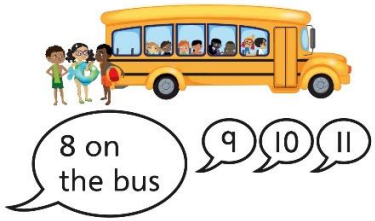
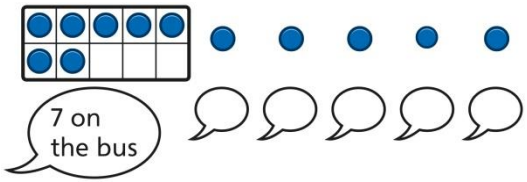
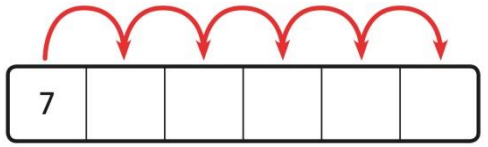
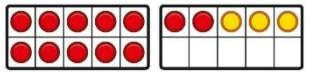
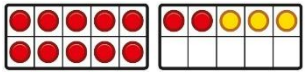
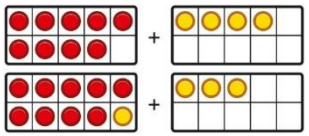
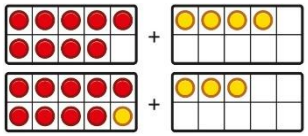
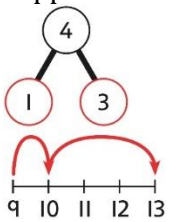
In this key stage, it is vital that children explore and experience a variety of strong images and manipulative representations of equal groups, including concrete experiences as well as abstract calculations.

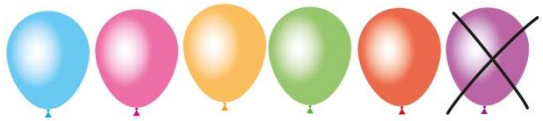
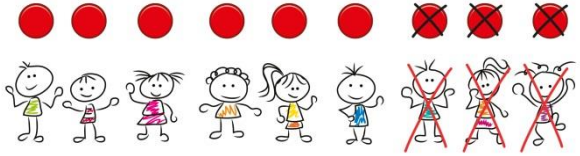
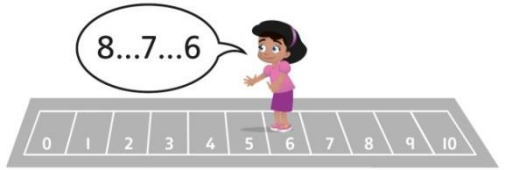
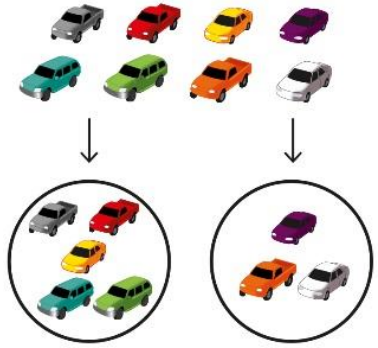
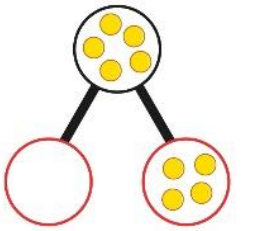
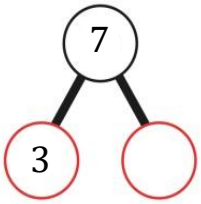
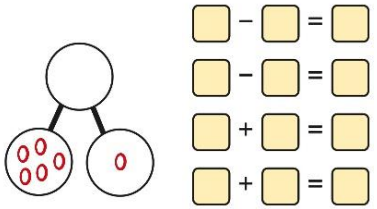
Children begin to recall some key multiplication facts, including doubles, and an understanding of the 2, 5 and 10 times-tables and how they are related to counting.

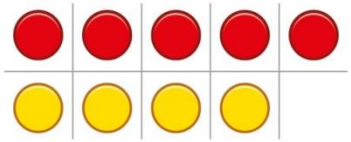
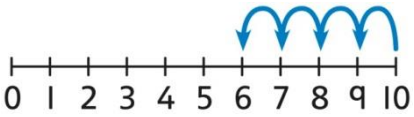
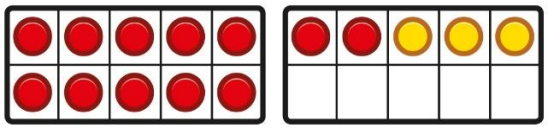
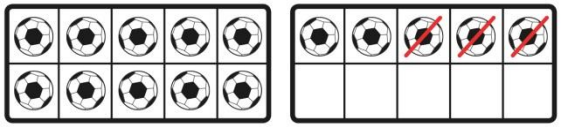
Year 1

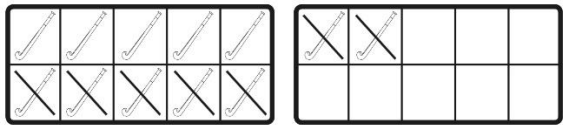
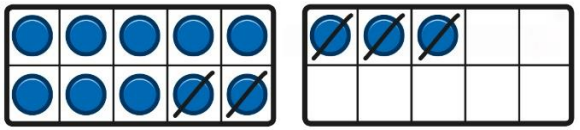
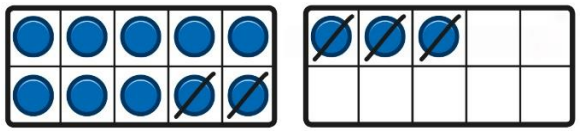
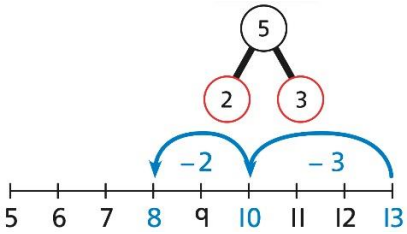
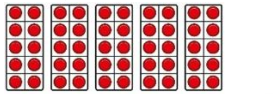
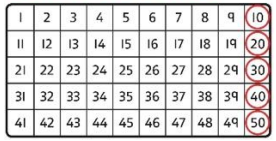
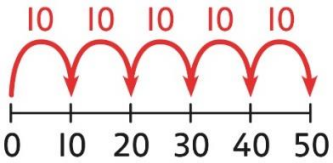
	Concrete	Pictorial	Abstract
Year 1 Addition	**Counting and adding more** Children add one more person or object to a group to find one more.	**Counting and adding more** Children add one more cube or counter to a group to represent one more.  *One more than 4 is 5.*	**Counting and adding more** Use a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

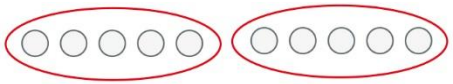
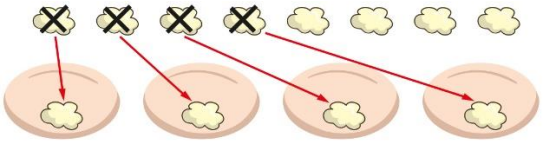
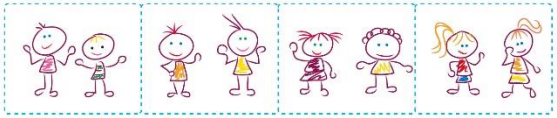
<table>
<tr>
<td rowspan="2">Year 1 Addition</td>
<td>Knowing and finding number bonds within 10
Break apart a group and put back together to find and form number bonds.
 
6 = 2 + 4
 
10 = 7 + 3
  </td>
<td>Knowing and finding number bonds within 10
Use five and ten frames to represent key number bonds.
 
5 = 4 + 1
 
10 = 7 + 3</td>
<td>Knowing and finding number bonds within 10
Use a part-whole model alongside other representations to find number bonds. Make sure to include examples where one of the parts is zero.
 
4 + 0 = 4
 
 
3 + 1 = 4
  </td>
</tr>
<tr>
<td>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.
 
14 is 10 and 4 more.</td>
<td>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.</td>
<td>Understanding teen numbers as a complete 10 and some more.
1 ten and 3 ones equal 13.
10 + 3 = 13</td>
</tr>
</table>

Year 1 Addition	**Adding by counting on** Children use knowledge of counting to 20 to find a total by counting on using people or objects. 	**Adding by counting on** Children use counters to support and represent their counting on strategy. 	**Adding by counting on** Children use number lines or number tracks to support their counting on strategy.  7 + 5 = ☐
	Adding the 1s Children use bead strings to recognise how to add the 1s to find the total efficiently.  *2 + 3 = 5* *12 + 3 = 15*  *2 + 3 = 5* *12 + 3 = 15*	**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*
	Bridging the 10 using number bonds Children use a bead string to complete a 10 and understand how this relates to the addition.  	**Bridging the 10 using number bonds** Children use counters to complete a ten frame and understand how they can add using knowledge of number bonds to 10.  .	**Bridging the 10 using number bonds** Use a part-whole model and a number line to support the calculation.  *9 + 4 = 13*

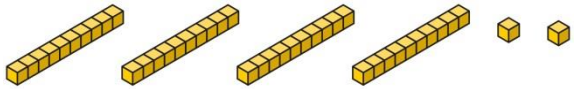
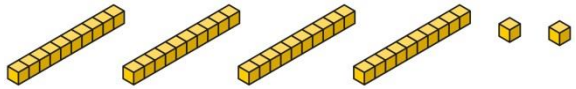
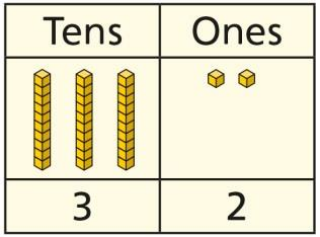
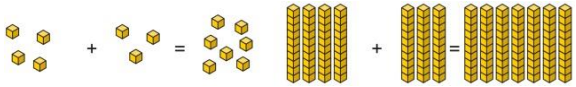
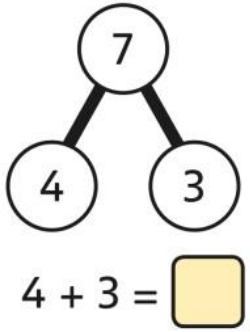
Year 1 Subtraction	**Counting back and taking away** Children arrange objects and remove to find how many are left.  *1 less than 6 is 5.* *6 subtract 1 is 5.*	**Counting back and taking away** Children draw and cross out or use counters to represent objects from a problem.  9 – ☐ = ☐ There are ☐ children 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. 

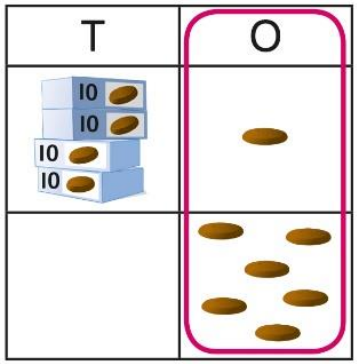
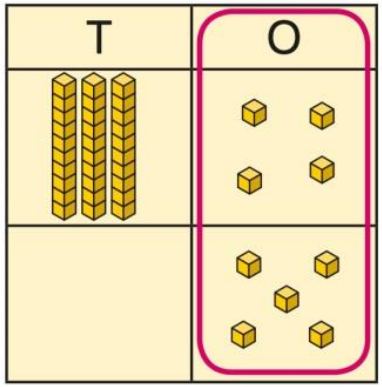
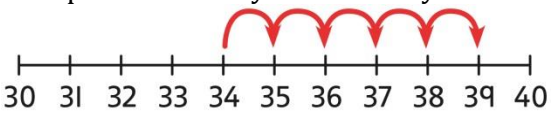
Year 1 **Subtraction**	**Finding the difference** Arrange two groups so that the difference between the groups can be worked out.  *8 is 2 more than 6.* *6 is 2 less than 8.* *The difference between 8 and 6 is 2.* 	**Finding the difference** Represent objects using sketches or counters to support finding 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*  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*

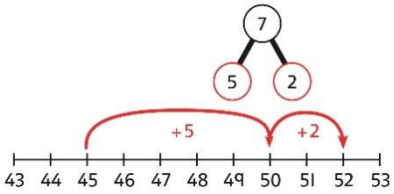
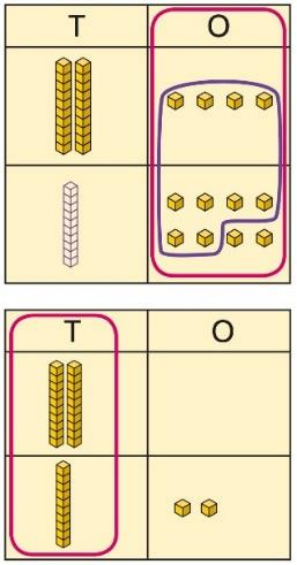
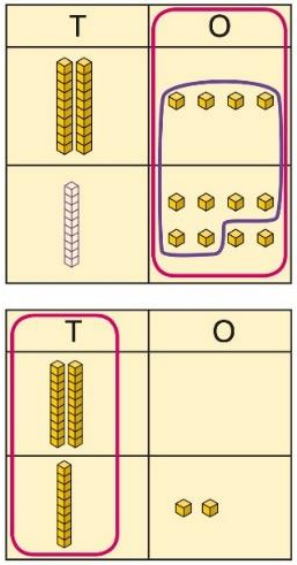
Year 1 Subtraction	**Subtraction bridging 10 using number bonds** For example: 12 – 7 Arrange objects into a 10 and some 1s, then decide on how to split the 7 into parts.  *7 is 2 and 5, so I take away the 2 and then the 5.* 	**Subtraction bridging 10 using number bonds** Represent the use of bonds using ten frames.  *For 13 – 5, I take away 3 to make 10, then take away 2 to make 8.*	**Subtraction bridging 10 using number bonds** Use a number line and a part-whole model to support the method. *13 – 5* 
Year 1 Multiplication	**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.  Describe equal groups using words: Three equal groups of 4. Four equal groups of 3.

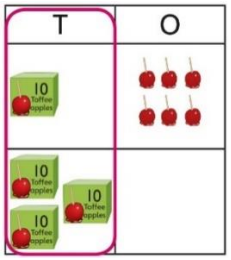
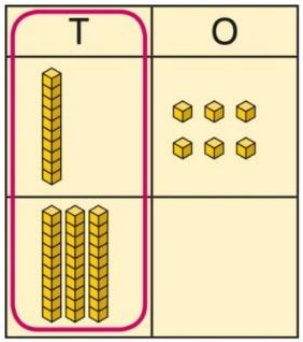
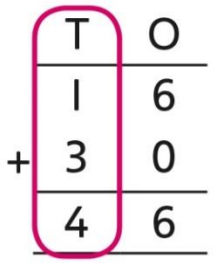
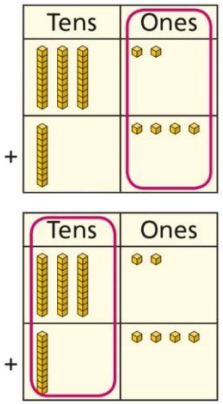
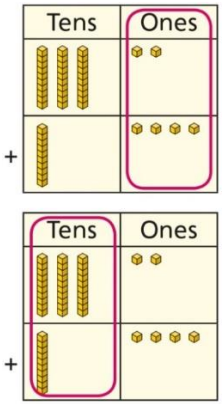
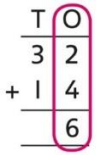
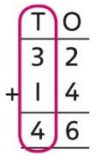
Year 1 **Division**	**Grouping** Learn to make equal groups from a whole and find how many equal groups of a certain size can be made. Sort a whole set people and objects into equal groups.  *There are 10 children altogether.* *There are 2 in each group.* *There are 5 groups.*	**Grouping** Represent a whole and work out how many equal groups.  *There are 10 in total.* *There are 5 in each group.* *There are 2 groups.*	**Grouping** 10 ÷ 2 = 5
	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.* 10 ÷ 2 = 5

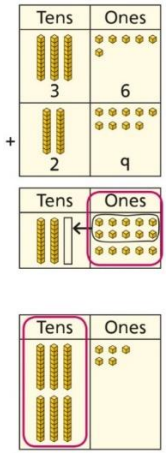
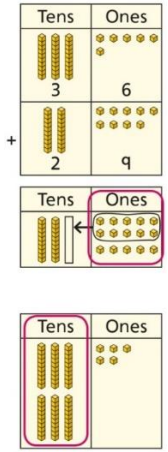
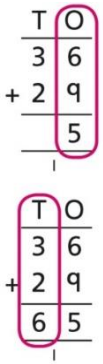
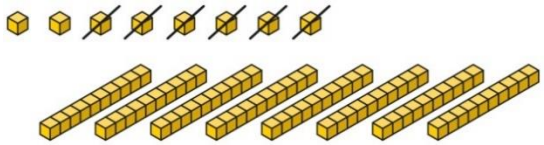
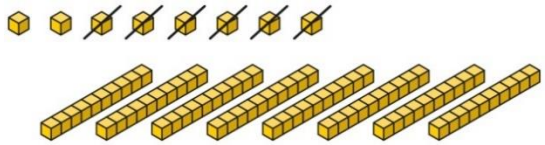
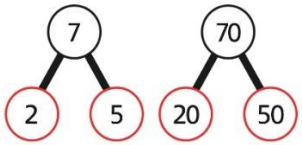
Year 2

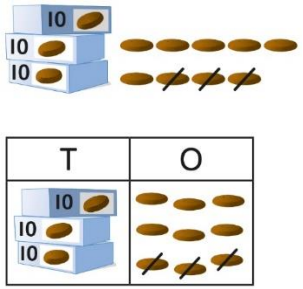
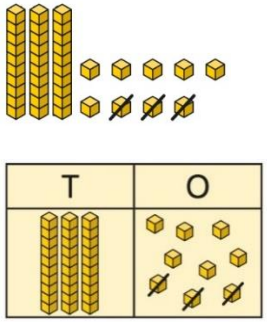
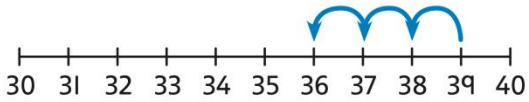
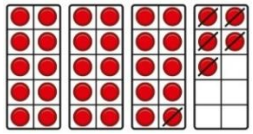
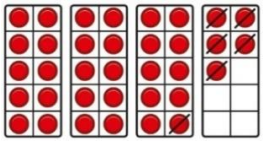
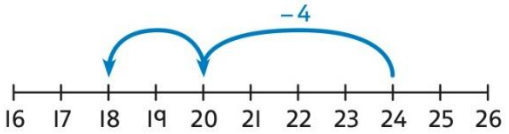
	Concrete	Pictorial	Abstract
Year 2 Addition	**Understanding 10s and 1s** Use dienes block to create numbers in 10s and 1s. 	**Understanding 10s and 1s** Understand 10s and 1s equipment, and link with visual representation and drawings. 	**Understanding 10s and 1s** Represent and draw numbers on a place value grid.  Tens | Ones 4 | 3
	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.*	**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.*	**Adding 10s** Use known bonds and unitising to add 10s.  *4 + 3 = 7* *4 tens + 3 tens = 7 tens* *40 + 30 = 70*

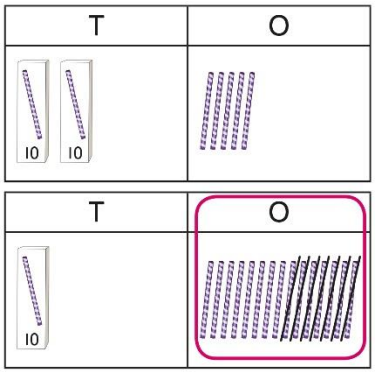
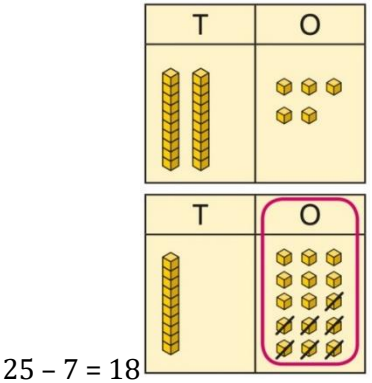
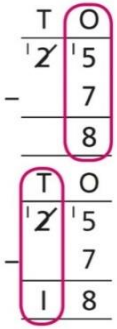
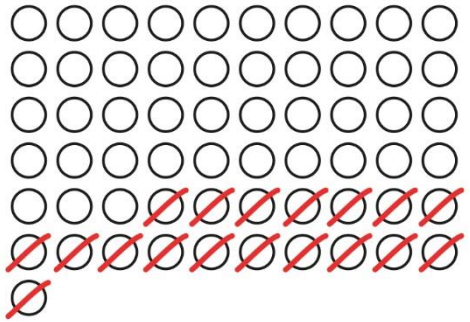
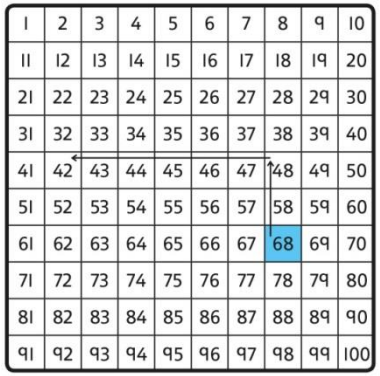
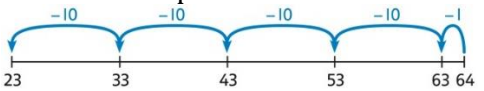
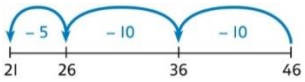
Year 2 Addition	**Adding a 1-digit number to a 2-digit number not bridging a 10** Add the 1s to find the total. Use known bonds within 10.  *41 is 4 tens and 1 one.* *41 add 6 ones is 4 tens and 7 ones.* This can also be done in a place value grid.  	**Adding a 1-digit number to a 2-digit number not bridging a 10** Add the 1s.  *34 is 3 tens and 4 ones.* *4 ones and 5 ones are 9 ones.* *The total is 3 tens and 9 ones.*  	**Adding a 1-digit number to a 2-digit number not bridging a 10** Add the 1s. Understand the link between counting on and using known number facts. Children should be encouraged to use known number bonds to improve efficiency and accuracy.  *34 + 5 = 39*

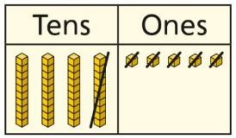
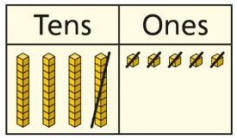
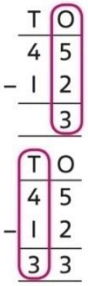
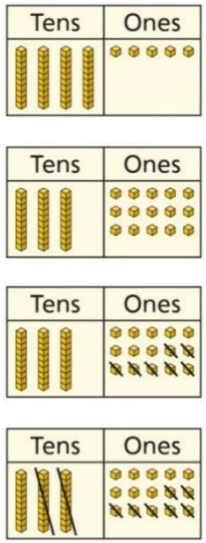
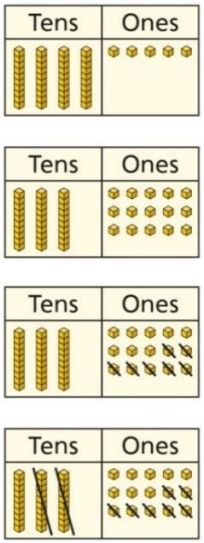
Year 2 Addition	**Adding a 1-digit number to a 2-digit number bridging 10** Complete a 10 using number bonds.  *There are 4 tens and 5 ones.* *I need to add 7. I will use 5 to complete a 10, then add 2 more.*	**Adding a 1-digit number to a 2-digit number bridging 10** Complete a 10 using number bonds. 	**Adding a 1-digit number to a 2-digit number bridging 10** Complete a 10 using number bonds. *45 + 7 =* *7 = 5 + 2* *45 + 5 + 2 = 52*
	Adding a 1-digit number to a 2-digit number using exchange Exchange 10 ones for 1 ten (Use physical dienes blocks) 	**Adding a 1-digit number to a 2-digit number using exchange** Exchange 10 ones for 1 ten. (Use pictorial representations of dienes blocks) 	**Adding a 1-digit number to a 2-digit number using exchange** Exchange 10 ones for 1 ten. 

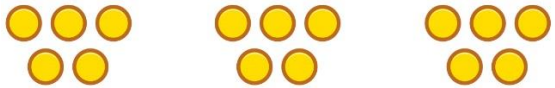
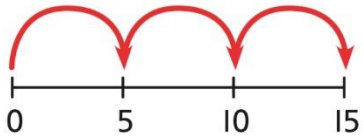
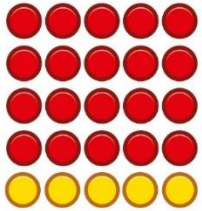
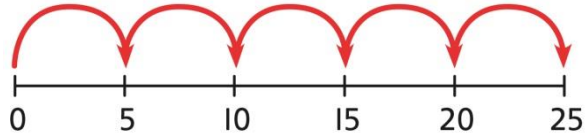
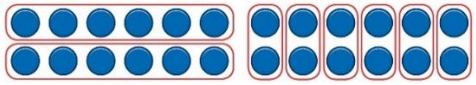
Year 2 Addition	**Adding a multiple of 10 to a 2-digit number using columns** Add the 10s using a place value grid to support.  *16 is 1 ten and 6 ones.* *30 is 3 tens.* *There are 4 tens and 6 ones in total.*	**Adding a multiple of 10 to a 2-digit number using columns** Add the 10s using a place value grid to support.  *16 is 1 ten and 6 ones.* *30 is 3 tens.* *There are 4 tens and 6 ones in total.*	**Adding a multiple of 10 to a 2-digit number using columns** Add the 10s represented vertically. Children must understand how the method relates to unitising of 10s and place value.  *1 + 3 = 4* *1 ten + 3 tens = 4 tens* *16 + 30 = 46*
	Adding two 2-digit numbers using a place value grid Add the 1s. Then add the 10s. Use physical dienes blocks.  	**Adding two 2-digit numbers using a place value grid** Add the 1s. Then add the 10s. Use pictorial representations of dienes blocks.  	**Adding two 2-digit numbers using a place value grid** Add the 1s. Then add the 10s.  

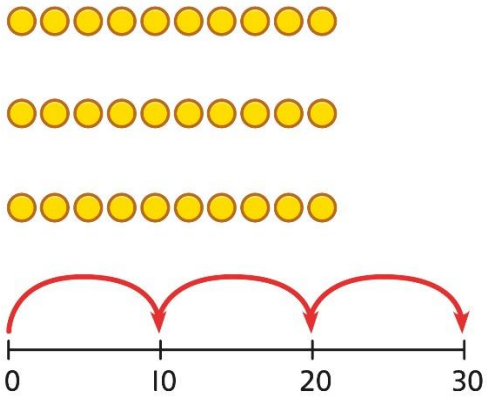
	Adding two 2-digit numbers with exchange Add the 1s. Exchange 10 ones for a ten. Then add the 10s. Use physical dienes blocks. 	**Adding two 2-digit numbers with exchange** Add the 1s. Exchange 10 ones for a ten. Then add the 10s. Use pictorial representations of dienes blocks. 	**Adding two 2-digit numbers with exchange** Add the 1s. Exchange 10 ones for a ten. Then add the 10s. 
Year 2 **Subtraction**	**Subtracting multiples of 10** Use known number bonds and unitising to subtract multiples of 10. Use physical dienes blocks.  *8 subtract 6 is 2.* *So, 8 tens subtract 6 tens is 2 tens.*	**Subtracting multiples of 10** Use known number bonds and unitising to subtract multiples of 10. Use pictorial representations of dienes blocks.  *8 subtract 6 is 2.* *So, 8 tens subtract 6 tens is 2 tens.*	**Subtracting multiples of 10** Use known number bonds and unitising to subtract multiples of 10.  *7 tens subtract 5 tens is 2 tens.* *70 – 50 = 20*

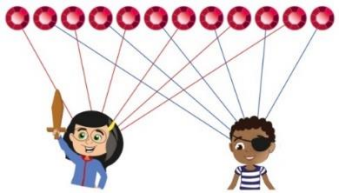
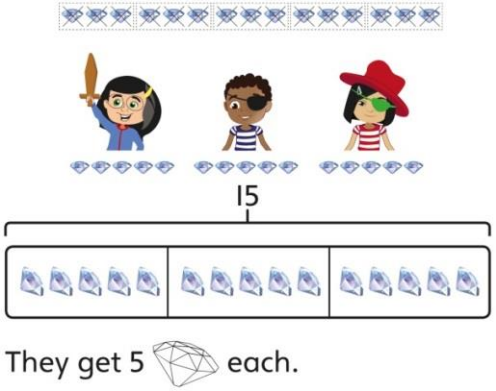
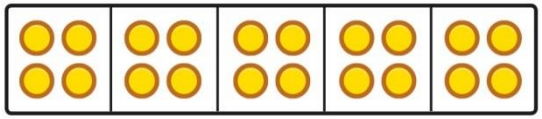
	Subtracting a single-digit number Subtract the 1s. This may be done in or out of a place value grid. 	**Subtracting a single-digit number** Subtract the 1s. This may be done in or out of a place value grid. 	**Subtracting a single-digit number** Subtract the 1s. Understand the link between counting back and subtracting the 1s using known bonds. 
	Subtracting a single-digit number bridging 10 Bridge 10 by using known bonds.  *35 – 6* *I took away 5 counters, then 1 more.*	**Subtracting a single-digit number bridging 10** Bridge 10 by using known bonds.  *35 – 6* *First, I will subtract 5, then 1.*	**Subtracting a single-digit number bridging 10** Bridge 10 by using known bonds.  *24 – 6 = ?* *24 – 4 – 2 = ?*

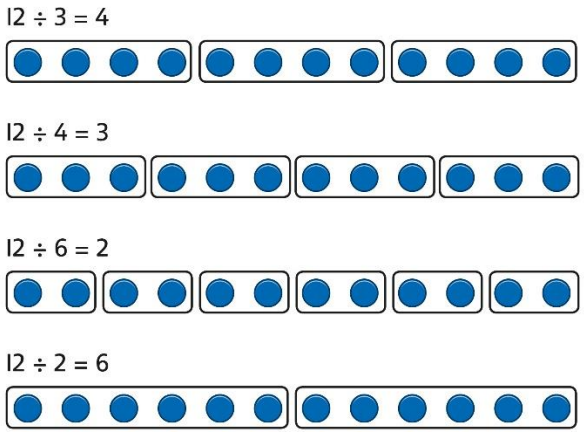
Year 2 Subtraction	**Subtracting a single-digit number using exchange** Exchange 1 ten for 10 ones. This may be done in or out of a place value grid. 	**Subtracting a single-digit number using exchange** Exchange 1 ten for 10 ones.  25 – 7 = 18	**Subtracting a single-digit number using exchange** Exchange 1 ten for 10 ones.  *25 – 7 = 18*
	Subtracting a 2-digit number Subtract by taking away.  *61 – 18* *I took away 1 ten and 8 ones.*	**Subtracting a 2-digit number** Subtract the 10s and the 1s. This can be represented on a 100 square. 	**Subtracting a 2-digit number** 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* 

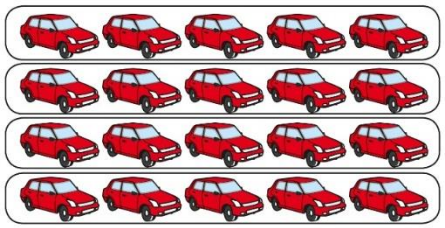
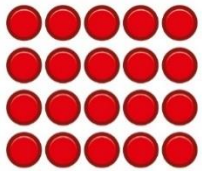
Year 2 Subtraction	**Subtracting a 2-digit number using place value and columns** Subtract the 1s. Then subtract the 10s. This may be done in or out of a place value grid. Use physical resources.  *45 – 16 = 30*	**Subtracting a 2-digit number using place value and columns** Subtract the 1s. Then subtract the 10s. Use pictorial representation of physical resources.  *45 – 16 = 30*	**Subtracting a 2-digit number using place value and columns** Using column subtraction, 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. Use physical dienes blocks.  	**Subtracting a 2-digit number with exchange** Exchange 1 ten for 10 ones. Then subtract the 1s. Then subtract the 10s. Use pictorial representations of dienes blocks.  	**Subtracting a 2-digit number with exchange** Using column subtraction, exchange 1 ten for 10 ones. Then subtract the 1s. Then subtract the 10s. 

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

Year 2 Multiplication	**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*	**Learning ×2, ×5 and ×10 table facts** Understand how to relate counting in unitised groups and repeated addition with knowing key times-table facts.  *10 + 10 + 10 = 30* *3 × 10 = 30*	**Learning ×2, ×5 and ×10 table facts** Understand how the times-tables increase and contain patterns. 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

Year 2 **Division**	**Sharing equally** Start with a whole and share into equal parts, one at a time.  *12 shared equally between 2.* *They get 6 each.* Start to understand how this also relates to grouping. To share equally between 3 people, take a group of 3 and give 1 to each person. Keep going until all the objects have been shared  *15 shared equally between 3.* *They get 5 each.*	**Sharing equally** 20 shared into 5 equal parts. There are 4 in each part. 	**Sharing equally** *18 ÷ 2 = 9*

<table>
<tr>
<td rowspan="2">Year 2
Division</td>
<td>Grouping equally
Understand how to make equal groups from a whole.
 
8 divided into 4 equal groups.
There are 2 in each group.</td>
<td>Grouping equally
Understand the relationship between grouping and the division statements.
 
</td>
<td>Grouping equally
12 divided into groups of 3.
12 ÷ 3 = 4

There are 4 groups.</td>
</tr>
<tr>
<td>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.</td>
<td>Using known times-tables to solve divisions
Link equal grouping with known times-table facts to support division.
 
20 divided by 5 is 4.</td>
<td>Using known times-tables to solve divisions
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</td>
</tr>
</table>