PERRAN-AR-WORTHAL CP SCHOOL

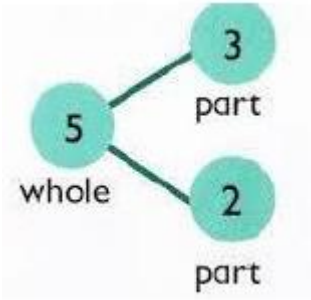
Every Moment Matters

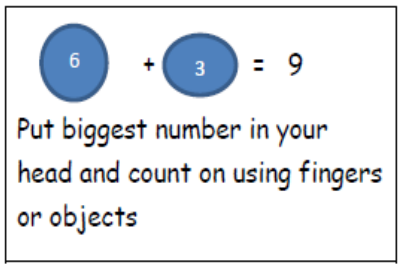
Perran-ar-worthal School Calculation Policy (updated Feb 2020)

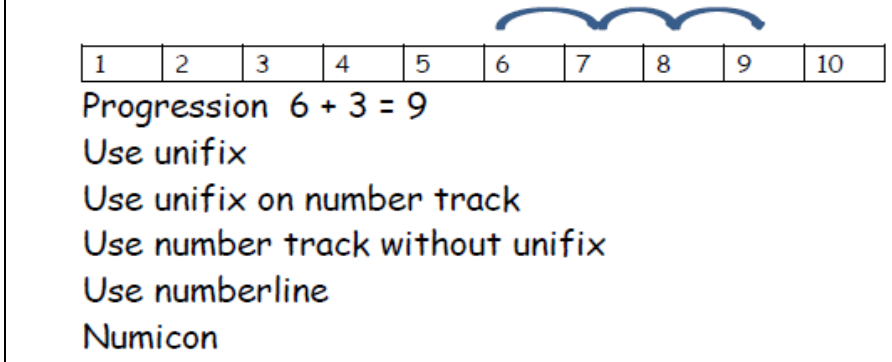
(adapted from the White Rose Calculation Policy)

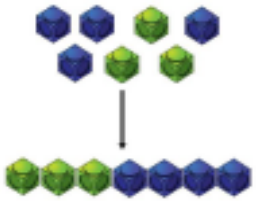
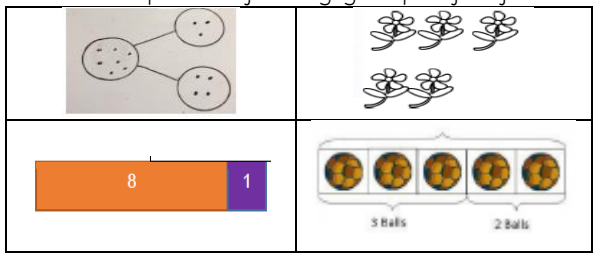
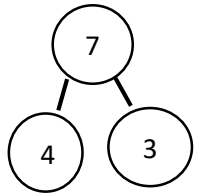
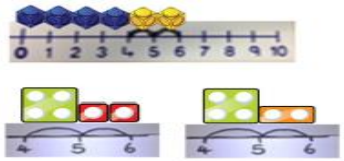
Addition Guidance: Children are always encouraged to think about what is the most efficient method for the calculation	
Stage	
EYFS Statutory Requirements 2014	Pupils should be taught to: • Birth –to 11 months – notice changes in number of objects / images, sounds in groups of and up to 3 • 8 – 20 months - has some understanding that things exist even when out of sight • 16-26 months – Begins to organise and categorise objects -sorting • 22 – 36 months – knows that a group of things changes in quantity when something is added or taken away • 30 – 50 – separates a group of 3 or 4 objects in different ways beginning to recognise that the total is still the same • 40-60 – finds the total number of items in two groups by counting all of them In practical activities and discussions begin to use the vocabulary involved in addition
EYFS 1	Counting objects, counting songs, sorting objects, recognising numbers in the inside and outside environment, counting and numbers in stories and poems and counting along number lines. 
EYFS 2	Pupils should be taught to: Early Learning Goal - Children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. Count on from first group to add two groups of objects.

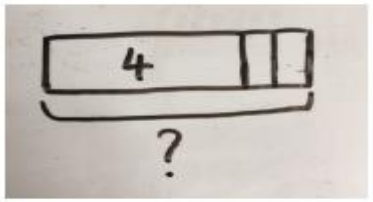
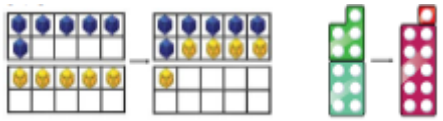
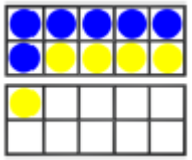
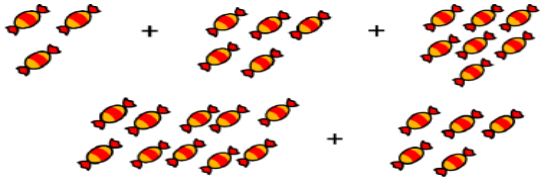
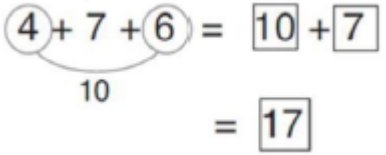
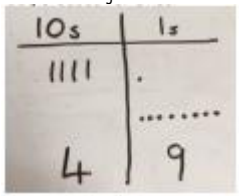
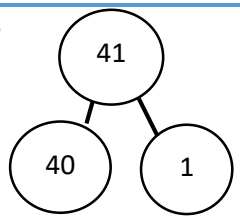
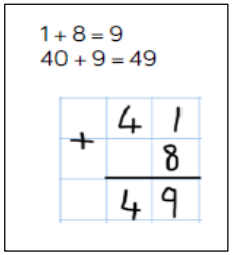
5 + ? = 10

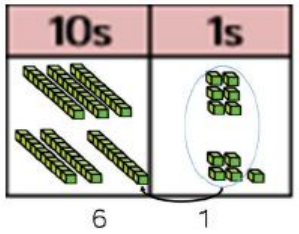
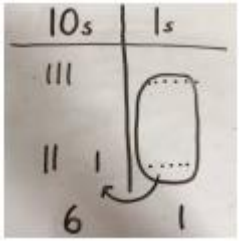
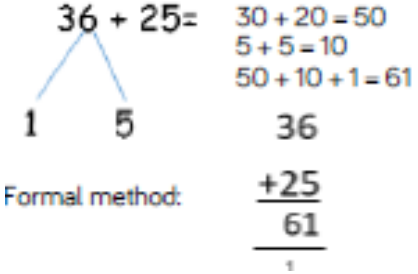
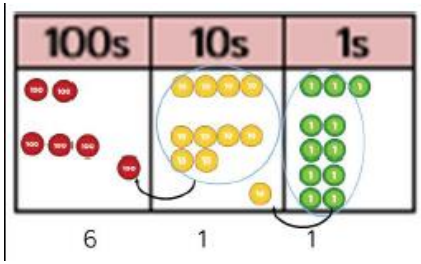
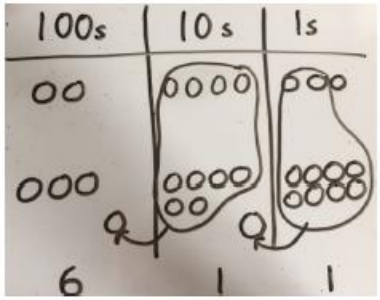






	Year 1 Stages 2/3/4/5	Year 2 Stages 5/6/7	Year 3 Stages 7/8 (Up to 3 digits)	Year 4 Stages 8/9 (Up to 4 digits)	Year 5 Stage 9 (Up to 6 digits and decimals)	Year 6 Stage 9 (Up to 7 digits and decimals)
Stages	Concrete		Pictorial		Abstract	
3	Combining two parts to make a whole (using a variety of objects) 		Children represent joining groups of objects  		4 is a part. 3 is a part. 7 is a whole. 4 + 3 = 7  	
4	Counting on from the largest number 		A bar model which encourages the children to count on, rather than count all.		Use an abstract number line: • What is 2 more than 4? • What is the sum of 2 and 4? • What is the total of 4 and 2? • 4 + 2	

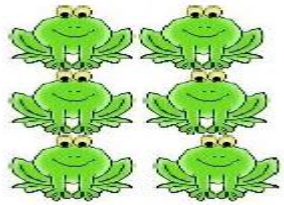
			
5	Regrouping to make 10, using ten frames and counters/cubes or using Numicon. 6 + 5 	Children to draw the ten frame and counters / cubes. 	Children to develop an understanding of equality: 6 + ☐ = 11 6 + 5 = 5 + ☐ 6 + 5 = ☐ + 4
6	Adding 3 objects 4 + 7 + 6 = 17 Put 4 and 6 together to make 10. Add on 7 	Draw pictures to recombine groups to make 10: 	Combine the 2 numbers that make 10 and then add on the remainder: 
7	TO + O using base 10. Continue to develop understanding of partitioning and place value.  41 + 8	Children to represent the base 10 E.g. lines for tens and dots/crosses for ones: 	41 + 8  

8	TO + TO using base 10. Continue to develop understanding of partitioning and place value: 36 + 25  	Children to represent the base 10 in a place value chart:  	Looking for ways to make 10  Use rounding to approximate answers.
9	Use of place value counters to add HTO + TO, HTO + HTO etc. When there are 10 ones in the 1s column – we exchange for 1 ten, when there are 10 tens in the 10s column – we exchange for 1 hundred:  	Children to represent the counters in a place value chart, circling when they make an exchange:  	243 +368 611 1 1 2 3 . 3 6 1 9 . 0 8 0 5 9 . 7 7 0 + 1 . 3 0 0 9 3 . 5 1 1 2 1 2 Use rounding to approximate answers.

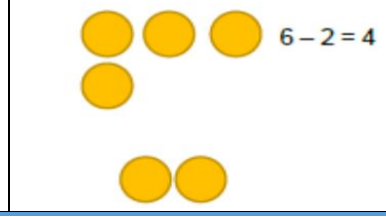
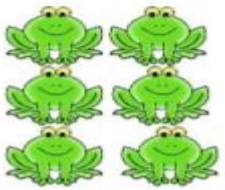
<table>
<tr><td colspan="2">Subtraction Guidance: Children are always encouraged to think about what is the most efficient method for the calculation</td></tr>
<tr><td>Stage</td><td></td></tr>
<tr><td>EYFS
Statutory Requirements 2014</td><td>Pupils should be taught to:

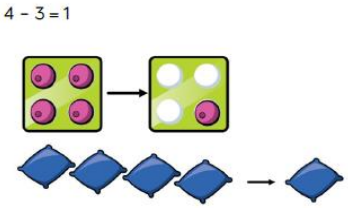
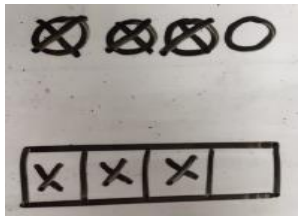
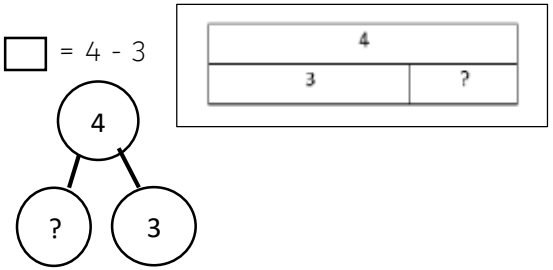
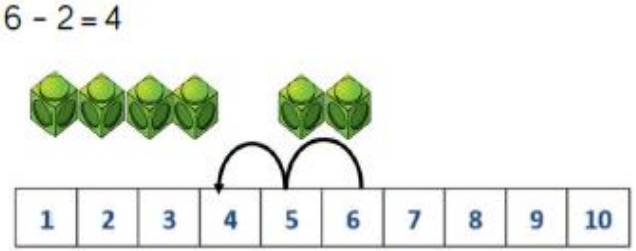
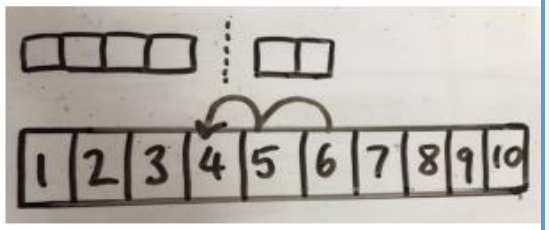
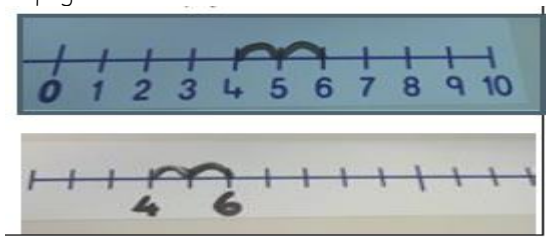
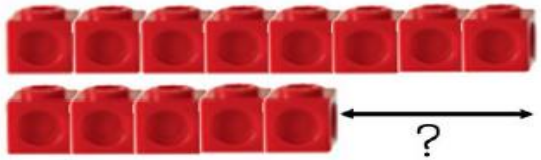
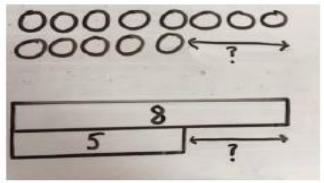
• Birth –to 11 months – notice changes in number of objects / images, sounds in groups of and up to 3
• 8 – 20 months - has some understanding that things exist even when out of sight
• 16-26 months – begins to organise and categorise objects -sorting
• 22 – 36 months – knows that a group of things changes in quantity when something is added or taken away
• 30 – 50 – separates a group of 3 or 4 objects in different ways beginning to recognise that the total is still the same
• 40-60 – understands subtraction as taking away objects from a group and counting on how many are left. In practical activities and discussions begins to use the vocabulary involved in addition and subtraction</td></tr>
<tr><td>EYFS

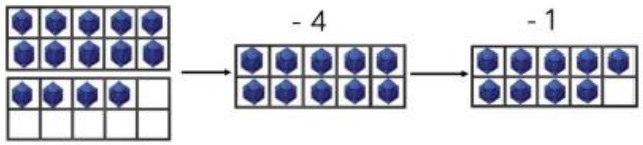
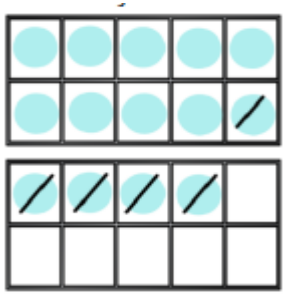
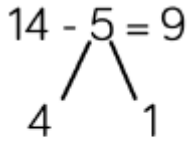
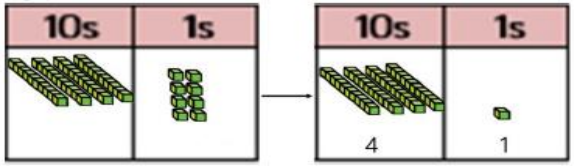
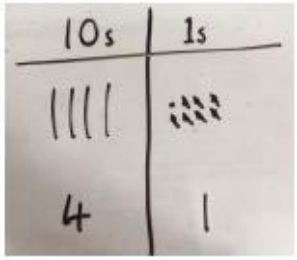
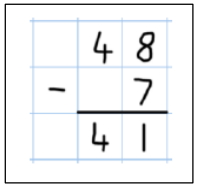
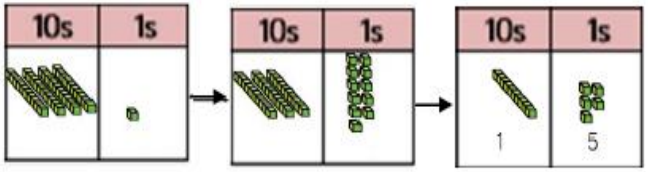
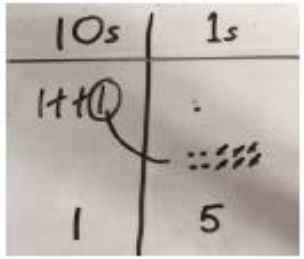
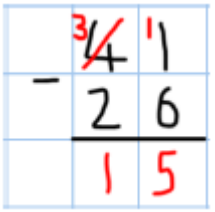
1</td><td>Counting objects, counting songs, sorting objects, recognising numbers in the inside and outside environment, counting and numbers in stories and poems and counting along number lines.

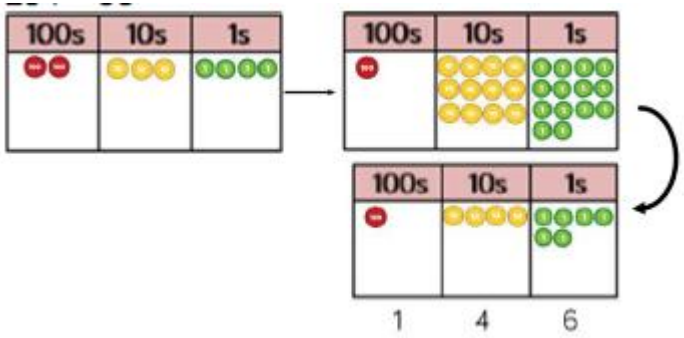
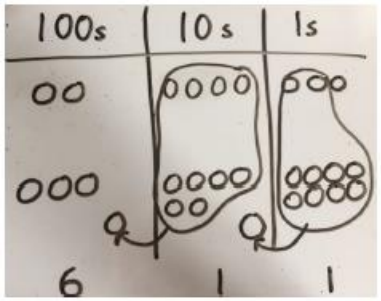
     </td></tr>
<tr><td>EYFS

2</td><td>Pupils should be taught to:
Early Learning Goal - Children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer.
Count back from large group as you take away - say count back as you take away.

6 – 2= 4
   </td></tr>
</table>

	Year 1 Stages 2/3/4/5	Year 2 Stages 5/6	Year 3 Stages 6/7/8 (Up to 3 digits)	Year 4 Stages 8/9 (Up to 4 digits)	Year 5 Stage 9 (Up to 6 digits and decimals)	Year 6 Stage 9 (Up to 7 digits and decimals)
Stages	Concrete		Pictorial		Abstract	
3	Physically taking away and removing objects from a whole (tens frames, Numicon, cubes etc) 		Children to draw the concrete resources they are using and cross out the correct amount. The bar model can also be used. 		4 – 3 = □ = 4 - 3 	
4	Counting back (using number lines or number tracks) children start with 6 and count back 2. 		Children to represent what they see pictorially: 		Children to represent the calculation on a number line or number track and show their jumps. Encourage children to use an empty number line. 	
5	Finding the difference (using cubes, Numicon or Cuisenaire rods, other objects can also be used). Calculate the difference between 8 and 5. 		Children to draw the cubes/other concrete objects which they have used or use the bar model to illustrate what they need to calculate. 		Find the difference between 8 and 5: 8 – 5 the difference is □ Children to explore why 9 – 6 = 8 – 5 = 7 – 4 have the same difference	

6	Making 10 using ten frames. 14 – 5 	Children to present the ten frame pictorially and discuss what they did to make 10: 	Children to show how they can make 10 by partitioning the subtraction:  14 – 4 = 10 10 – 1 = 9
7	Column method using base 10. 48 – 7 	Children to represent the base 10 pictorially: 	Column method or children could count back 7. 48 - 7 
8	Column method using base 10 and having to exchange. 41 - 26 	Represent the base 10 pictorially, remembering to show the exchange: 	Formal column method. Children must understand that when they have exchanged the 10 they still have 41 because 41 = 30 + 11  Use rounding to approximate answers.

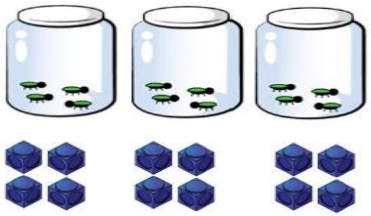
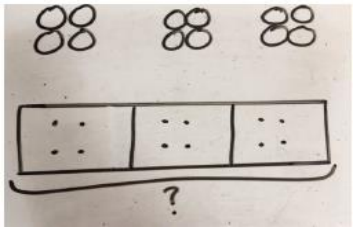
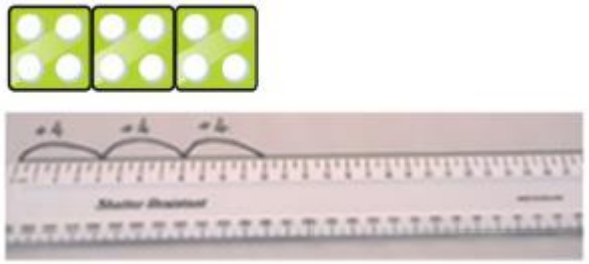
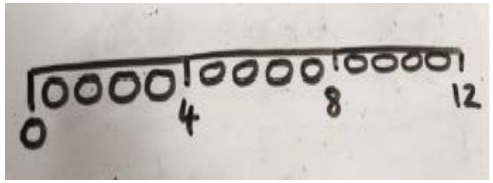
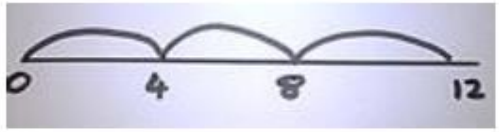
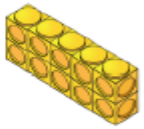
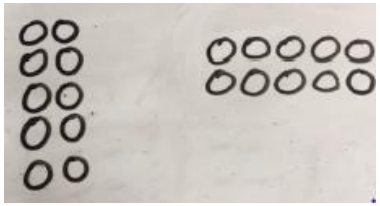
9	Column method using place value counters. 234 – 88  	Represent the place value counters pictorially, remembering to show what has been exchanged:  	Formal column method. Children must understand what has happened when they have crossed out digits: 2 1 2 3 4 - 8 8 6 £213.83 - £183.51 H T U • t h 1 1 2 1 3 • 8 3 1 8 3 • 5 1 0 3 0 • 3 2 Use rounding to approximate answers:

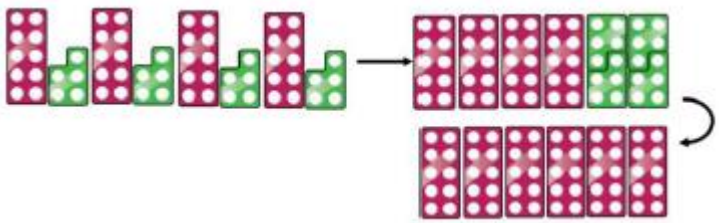
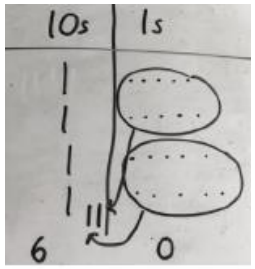
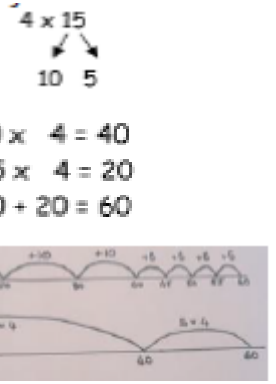
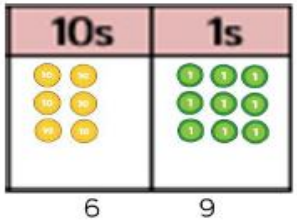
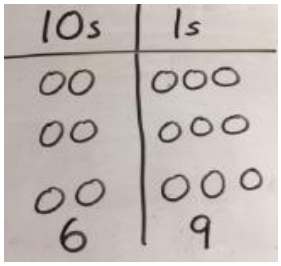
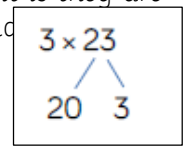
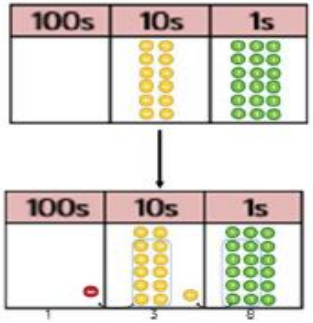
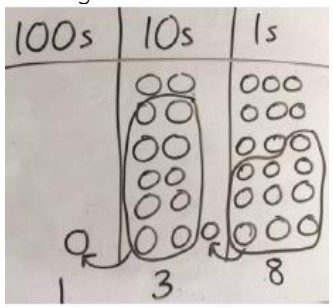
Multiplication Guidance: Children are always encouraged to think about what is the most efficient method for the calculation

Stage	
EYFS Statutory Requirements 2014	
EYFS 1	N/A
EYFS 2	Pupils should be taught to: Early Learning Goal Children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including <u>doubling</u>, halving and sharing.

Doubling Songs and Objects		Draw pictures to show how to double a number: Double 4 is 8 

Year 1 Stages 2/3	Year 2 Stages 3/4/5	Year 3 Stages 5/6/7 (Multiply a 2 digit number by a single digit)	Year 4 Stages 7/8 (Multiply a 3 digit number by a single digit)	Year 5 Stage 8 (Multiply 2 digit numbers by 2 and 3 digit numbers)	Year 6 Stage 8 (Multiply any 2 whole or decimal numbers together)

Stages	Concrete	Pictorial	Abstract
3	Repeated grouping/repeated addition 3 x 4 4 + 4 + 4 There are 3 equal groups, with 4 in each group. 	Children to represent the practical resources in a picture and use a bar model. 	3 x 4 = 12 4 + 4 + 4 = 12
4	Number lines to show repeated groups: 3 x 4 =  Cuisenaire rods can be used too.	Represent this pictorially alongside a number line E.g: 	Abstract number line showing three jumps of four. 3 x 4 = 12 
5	Use arrays to illustrate commutativity counters and other objects can also be used: 2 x 5 = 5 x 2  2 lots of 5  5 lots of 2	Children to represent the arrays pictorially: 	Children to be able to use an array to write a range of calculations E.g. 10 = 2 x 5 5 x 2 = 10 2 + 2 + 2 + 2 + 2 = 10 10 = 5 + 5

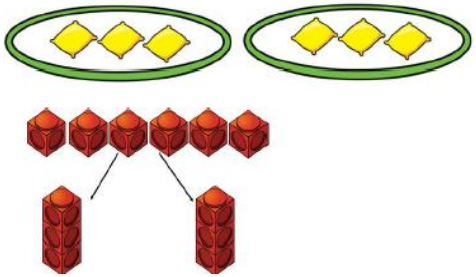
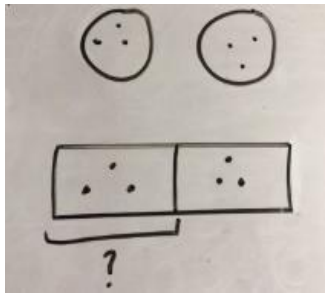
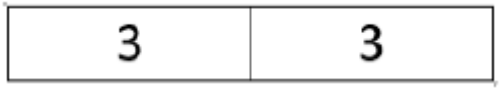
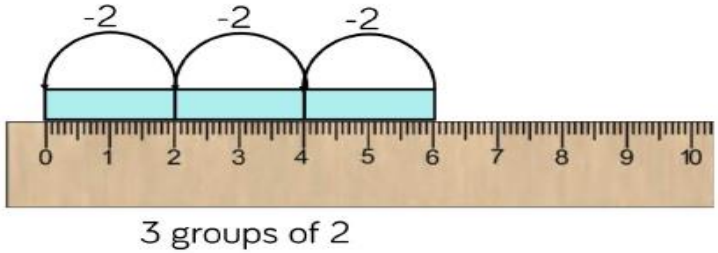
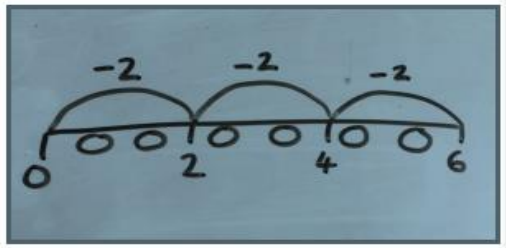
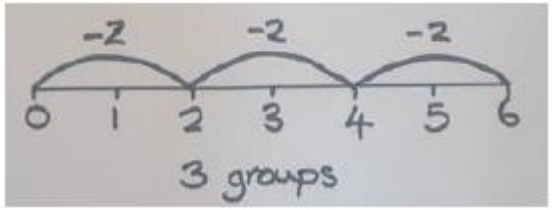
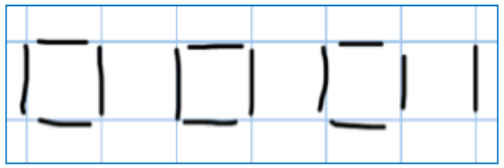
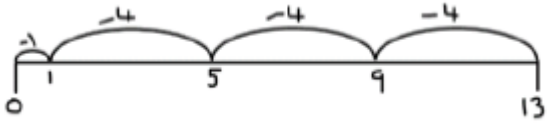
6	Partition to multiply using Numicon, base 10 or Cuisenaire rods. 4 x 15 	Children to represent the concrete manipulatives pictorially: 	Children to be encouraged to show the steps they have taken: 
7	Formal column method with place value counters (base 10 can also be used) 3 x 23 	Children to represent the counters pictorially: 	Children to record what it is they are doing to show understand  3 x 20 = 60 3 x 3 = 9 60 + 9 = 69 23 x 3 69
8	Formal column method with place value counters. 6 x 23 	Children to represent the counters/base 10, pictorially: 	Formal written method: 6 x 23 = 23 x 6 138 1 1 1 2 4 x 2 6 7 4 4 2 4 8 0 3 2 2 4 1 1 Use rounding to approximate answers.

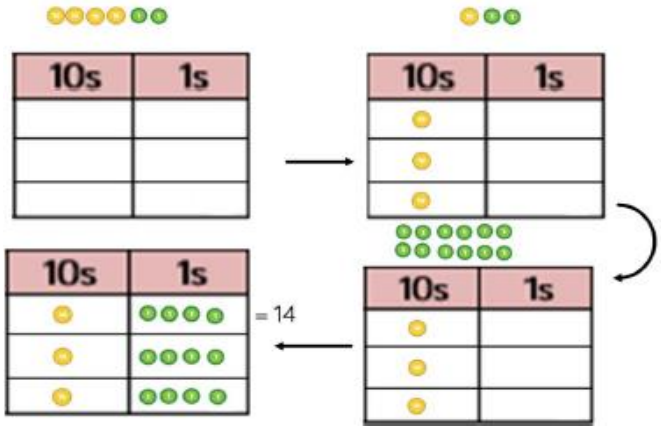
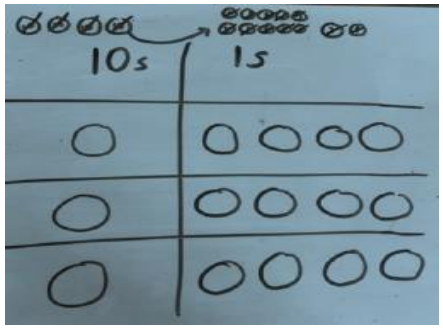
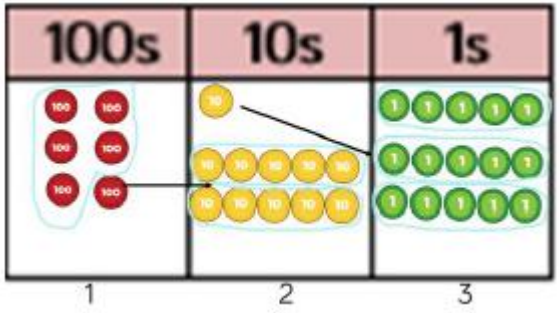
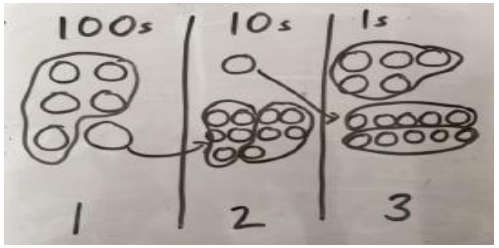
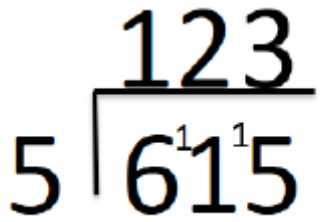
Division Guidance: Children are always encouraged to think about what is the most efficient method for the calculation

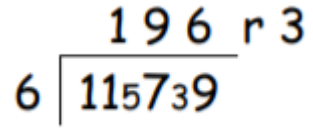
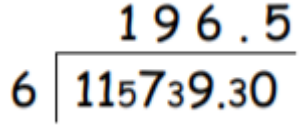
Stage	
EYFS Statutory Requirements 2014	
EYFS 1	N/A
EYFS 2	Pupils should be taught to: Early Learning Goal Children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, <u>halving and sharing</u>.

Cutting a variety of objects in half:	Sharing objects:
	

Year 1 Stages 2/3	Year 2 Stages 2/3/4	Year 3 Stages 4/5/6 (Divide a 2 digit number by a single digit)	Year 4 Stages 6/7 (Divide a 3 digit number by a single digit)	Year 5 Stage 7/8 (Use short division to divide 4 and 5 digit numbers leaving remainders as decimals and fractions)	Year 6 Stage 8 (Use long division to divide whole and decimal numbers by a 2 digit number)

Stages	Concrete	Pictorial	Abstract
3	Sharing using a range of objects. 6 ÷ 2 	Represent the sharing pictorially. 	6 ÷ 2 = 3  Children should also be encouraged to use their 2 times tables facts.
4	Repeated subtraction using Cuisenaire rods above a ruler. 6 ÷ 2 	Children to represent repeated subtraction pictorially. 	Abstract number line to represent the equal groups that have been subtracted. 
5	2 digits ÷ 1-digit with remainders using a variety of materials. E.g. lollypop sticks, counters and Cuisenaire rods etc. 13 ÷ 4 Use of lollypop sticks to form wholes- squares are made because we are dividing by 4:  There are 3 whole squares, with 1 left over.	Children to represent the lollipop sticks or lots of pictorially:  There are 3 whole squares, with 1 left over.	13 ÷ 4 = 3 remainder 1 Children should be encouraged to use their times tables facts; they could also represent repeated addition on a number line. '3 groups of 4, with 1 left over' 

6	Sharing using place value counters. 42 ÷ 3 = 14 	Children to represent the place value counters pictorially: 	Children to be able to make sense of the place value counters and write calculations to show the process. 42 ÷ 3 42 = 30 + 12 30 ÷ 3 = 10 12 ÷ 3 = 4 10 + 4 = 14 Introduce the bus stop method dividing 2 digit numbers by a single digit.
7	Short division using place value counters to group. 615 ÷ 5  1. Make 615 with place value counters. 2. How many groups of 5 hundreds can you make with 6 hundred counters? 3. Exchange 1 hundred for 10 tens. 4. How many groups of 5 tens can you make with 11 ten counters? 5. Exchange 1 ten for 10 ones. 6. How many groups of 5 ones can you make with 15 ones?	Represent the place value counters pictorially: 	Children to complete the calculation using the short division method (bus stop). 

8			1176 ÷ 6  The remainder is then interpretted as a fraction 3/5 and as a decimal:  432 ÷ 15