Fishponds
Church of England Academy

'Loving to Learn, Learning to Love'

Calculation Progression

		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6
Addition	**Pitch**	read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs represent and use number bonds and related subtraction facts within 20 add and subtract one-digit and two-digit numbers to 20, including zero solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = – 9.	Solve problems with addition and subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures Applying their increasing knowledge of mental and written methods Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: ♣ a two-digit number and ones ♣ a two-digit number and tens ♣ two two-digit numbers ♣ adding three one-digit numbers Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.	Add and subtract numbers mentally, including: - a three-digit number and ones - a three-digit number and tens - a three-digit number and hundreds Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction	Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate	Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) Add and subtract numbers mentally with increasingly large numbers	Continue to embed year 5 addition and subtraction

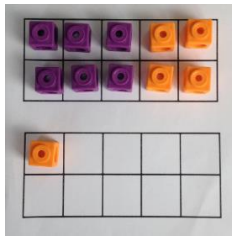
Methods

Pictures

6+5 =

Tens frames

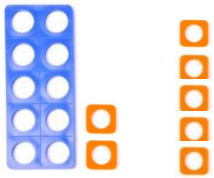
6 + 5 =



Numicon

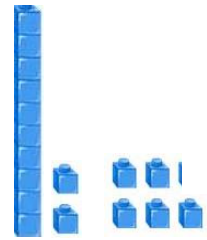
6 + 5 =

12 + 5



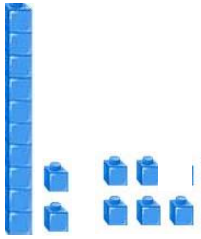
Base 10

12 + 5



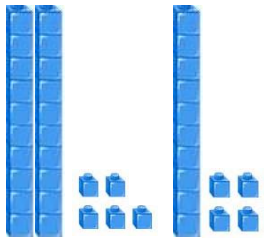
Base 10

12 + 5



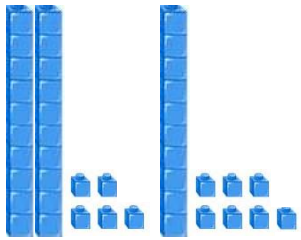
Count the tens and count on in ones

25 + 14 =



Count the tens then count on in the ones.

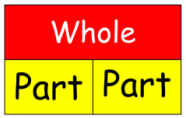
25 + 17 =

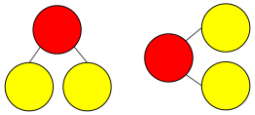


Count the tens then count on in the ones.

Model exchanging the ones for a ten and 2 ones.

Part Part Whole



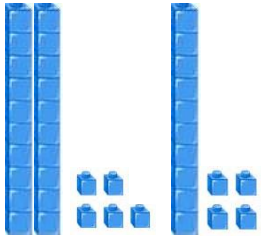


Part + Part = Whole

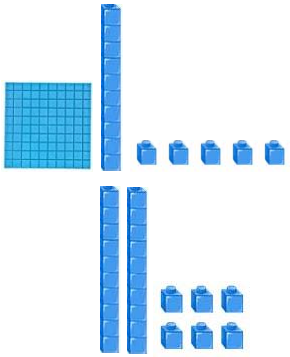
Whole - Part = Part

Base 10

25 + 14 =



115 + 26 =



Expanded Column Addition

	3	2	5	4
+	2	5	4	1
				5
			9	0
		7	0	0
	5	0	0	0
	5	7	9	5

	3	2	5	4
+	6	3	3	8
			1	2
			8	0
		5	0	0
	9	0	0	0
	9	5	9	2

	4	2	7	8
+	3	3	5	4
			1	2
		1	2	0
		5	0	0
	7	0	0	0
	7	6	3	2

Column Addition

	2	4	5	2	7
+	3	2	3	6	1
	5	6	8	8	8

	3	5	7	8	2
+	5	3	1	5	5
	8	8	9	3	7

	2	3	8	6	5	
+	2	5	9	8	6	
	4	9	8	5	1	

	6	5	4	3	4	8
+	3	3	8	2	7	6
	9	9	2	6	2	4

Adding more than 2 numbers

		2	6	4	5	9
		3	5	5	4	7
+		6	3	4	3	2
	1	2	5	4	3	8

	1	2	6	7	5	
	2	4	5	1	1	
	2	5	6	3	2	
+	4	2	8	3	3	
	9	5	6	5	1	

Column Addition

	6	5	4	3	4	8
+	3	3	8	2	7	6
	9	9	2	6	2	4

	8	9	6	5	4	2
+	1	3	2	7	3	7
1	0	2	9	2	7	9

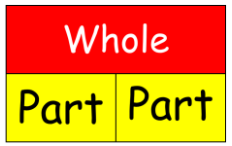
Decimals and different place values

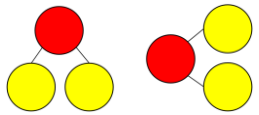
	2	3	0	5	6	7		
		5	6	1	0	2	5	6
+			4	5	2	6	8	
2	9	1	1	8	6	3	6	

Adding more than 2 numbers

		2	3	7	9	8	5
		2	7	6	4	2	9
+		7	3	4	2	3	6
1	2	4	8	6	5	4	

Part Part Whole

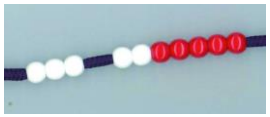




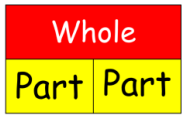
Part + Part = Whole

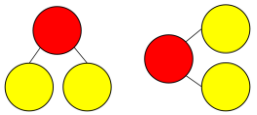
Whole - Part = Part

Number Bonds



Part Part Whole





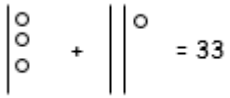
Part + Part = Whole

Whole - Part = Part

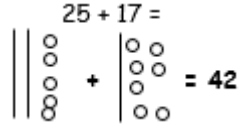
Chips and Peas

Chips represent the tens. Peas represent the ones. Talk about the number of chips and peas in each of the numbers. Draw the chips and peas. Count the chips in tens then the peas in ones.

13 + 21 =

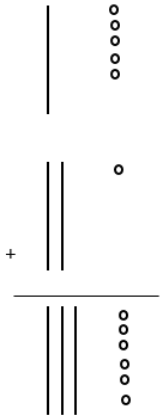


25 + 17 =

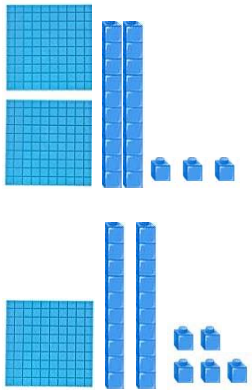


The children then progress into laying their chips and peas out in a column layout to prepare for column addition.

15 + 21 = 36



223 + 125 =



Place Value Counters

134 + 23 =

100s	10s	1s
100	10 10 10	1 1 1 1
	10 10	1 1 1

145 + 127 =

100s	10s	1s
100	10 10 10 10	1 1 1 1 1
100	10 10	1 1 1 1 1 1
	10	1

Place value counters also used to add multiples of 10 and 100.

Compact Column Addition

	2	5	6	2
+	3	4	2	1
	5	9	8	3

	2	5	6	6
+	1	3	2	7
	3	8	9	3

	2	5	6	6
+	5	2	8	2
	7	8	4	8

	3	5	6	6
+	5	1	9	6
	8	7	6	2

Adding More than 2 numbers

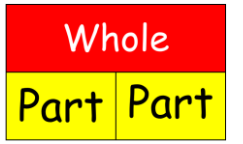
		2	3	4	3
		5	4	1	5
+		5	6	3	1
	1	3	7	8	9

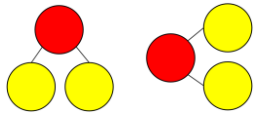
Adding Decimals

	£	2	5	6	7
+	£	3	2	7	2
	£	5	8	3	9

	£	2	5	6	2	5
	£		2	5	1	7
+	£		3	4	3	5
		3	1	5	7	7

Part Part Whole

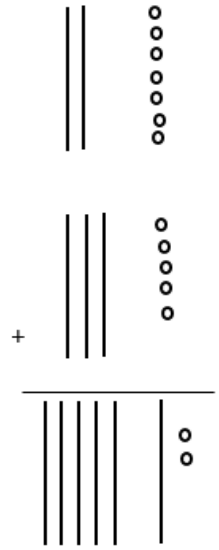




Part + Part = Whole

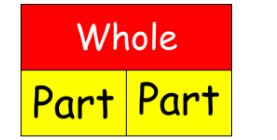
Whole - Part = Part

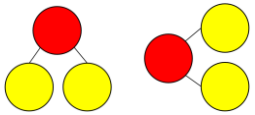
27 + 35 = 62



Start counting the ones as you would with column addition. When you get to ten model place the chip underneath the line and add any remaining peas. Place the chips below. Add up the total

Part Part Whole





Part + Part = Whole

Whole - Part = Part

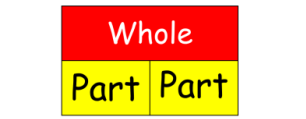
Expanded Column Addition

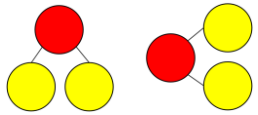
	2	3	5	
+	1	4	3	
			8	
		7	0	
	3	0	0	
	3	7	8	

	3	5	5	
+		4	3	
			8	
		9	0	
	3	0	0	
	3	9	8	

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

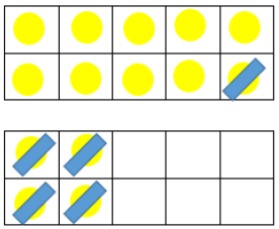
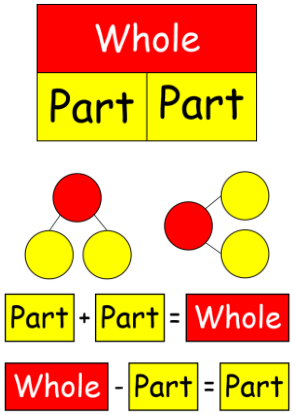
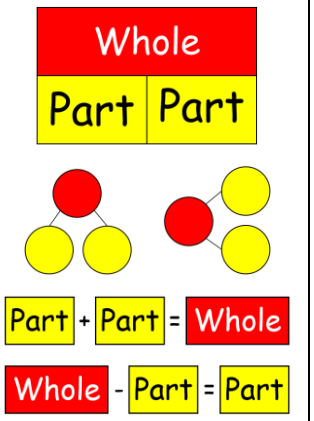
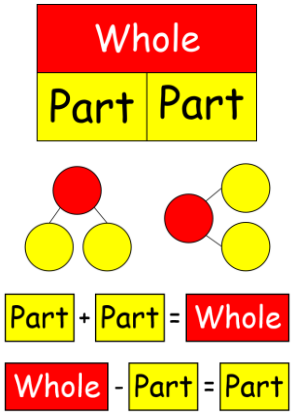
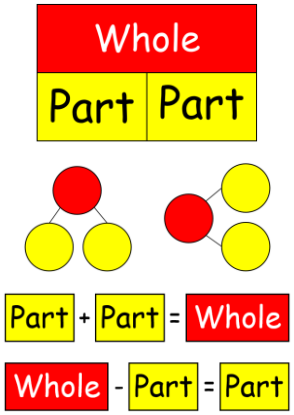
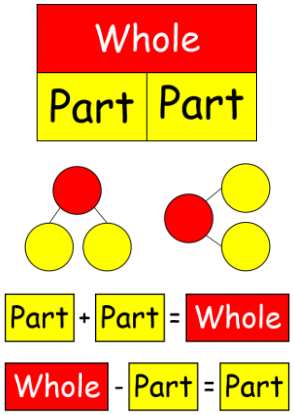
Part Part Whole



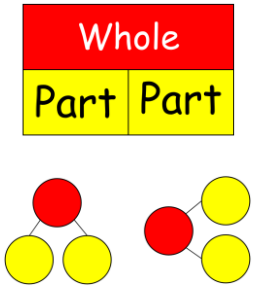


Part + Part = Whole

Whole - Part = Part

Subtraction	**Pitch**	read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs represent and use number bonds and related subtraction facts within 20 add and subtract one-digit and two-digit numbers to 20, including zero solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = – 9.	Solve problems with addition and subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures Applying their increasing knowledge of mental and written methods Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: ♣ a two-digit number and ones ♣ a two-digit number and tens ♣ two two-digit numbers ♣ adding three one-digit numbers Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.	Add and subtract numbers mentally, including: - a three-digit number and ones - a three-digit number and tens - a three-digit number and hundreds Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction	Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate	Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) Add and subtract numbers mentally with increasingly large numbers	Continue to embed year 5 addition and subtraction
	Methods	**Finding Difference** **Tens Frames** 14 - 5 	**Part Part Whole**  Part + Part = Whole Whole - Part = Part	**Part Part Whole**  Part + Part = Whole Whole - Part = Part	**Part Part Whole**  Part + Part = Whole Whole - Part = Part	**Part Part Whole**  Part + Part = Whole Whole - Part = Part	**Part Part Whole**  Part + Part = Whole Whole - Part = Part

Part Part Whole



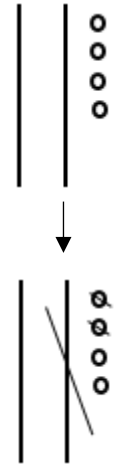
Part + Part = Whole

Whole - Part = Part

Base 10

Chips and Peas

24 – 12 =



32 – 18 =

Place Value Counters

156 – 23 =

100s	10s	1s
100	10 10 ~~10~~ ~~10~~ ~~10~~	1 1 ~~1~~ ~~1~~ ~~1~~ ~~1~~ ~~1~~ ~~1~~

546 – 224 =

100s	10s	1s
~~100~~ ~~100~~ ~~100~~ ~~100~~ ~~100~~	10 10 ~~10~~ ~~10~~ ~~10~~	1 1 ~~1~~ ~~1~~ ~~1~~ ~~1~~ ~~1~~ ~~1~~

152 – 35 =

100s	10s	1s
100	10 10 ~~10~~ ~~10~~ ~~10~~	1 1 ~~1~~ ~~1~~ ~~1~~ ~~1~~ ~~1~~ ~~1~~

Column Subtraction

	4	7	5
-	2	5	4
	2	2	1

Column Subtraction

	4	8	9	6
-	2	6	3	1
	2	2	6	5

			5	
	6	7	~~6~~	15
-	3	5	2	7
	3	2	3	8

		6		
	6	~~7~~	15	9
-	3	5	8	7
	3	1	7	2

		7	15	
	6	~~8~~	~~6~~	15
-	3	5	7	7
	3	2	8	8

		5	9	
	7	~~6~~	~~0~~	13
-	1	2	3	5
	6	3	6	8

Column Subtraction

	4	5	6	7	9
-	1	4	3	2	5
	3	1	3	5	4

			6		
	6	7	13	7	6
-	2	3	5	2	5
	4	3	8	5	1

		6			
	6	~~7~~	13	8	8
-	2	6	3	5	2
	4	6	4	6	6

		5	9		
	5	~~6~~	~~0~~	13	8
-	2	5	1	5	2
	3	0	8	8	6

		5		5	
	8	~~6~~	13	~~6~~	12 9
-	3	2	6	2	5 6
	5	3	7	3	7 3

Subtracting Decimals

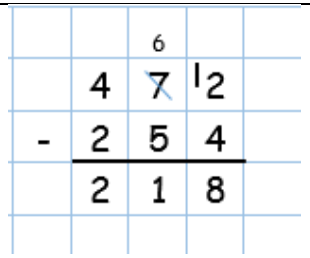
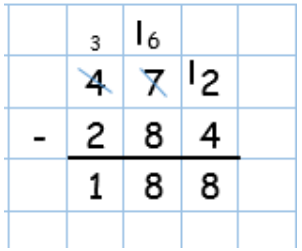
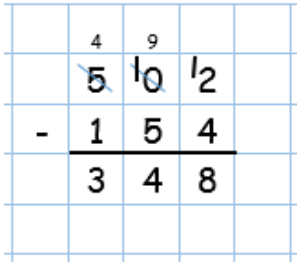
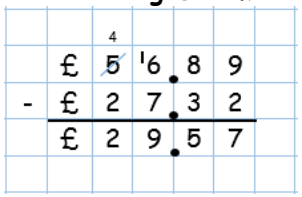
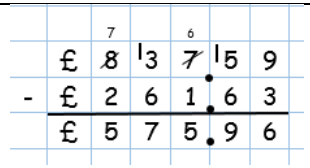
			4		
	£	~~5~~	~~6~~	8	9
-	£	2	7	3	2
	£	2	9	5	7

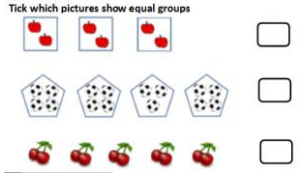
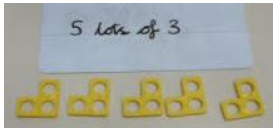
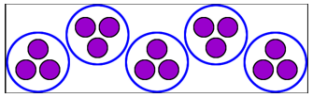
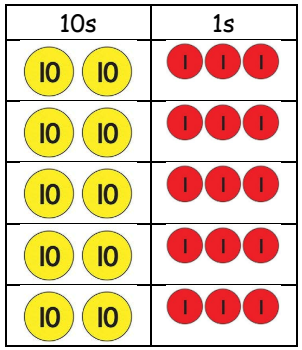
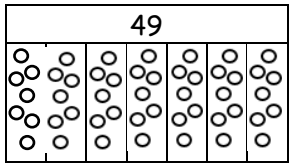
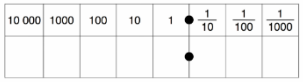
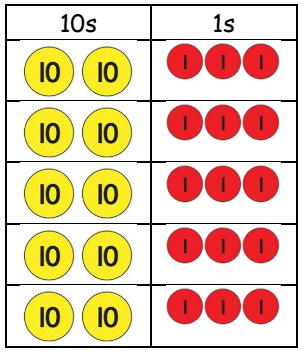
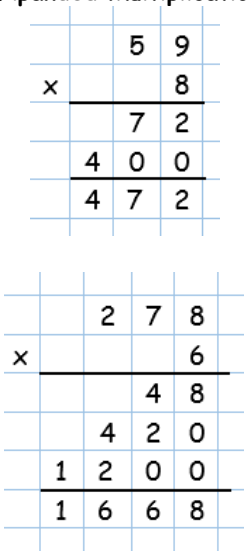
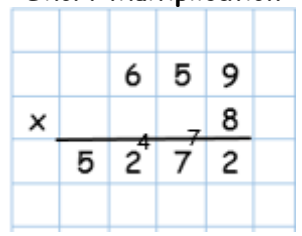
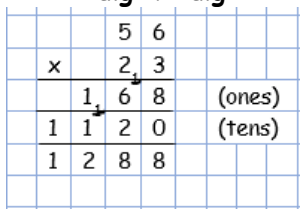
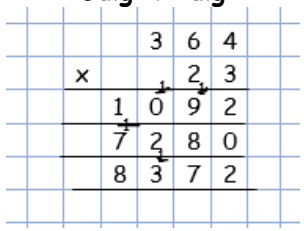
Column Subtraction

			6		
	6	~~7~~	13	7	6
-	2	3	5	2	5
	4	3	8	5	1

		5	9		
	5	~~6~~	~~0~~	13	8
-	2	5	1	5	2
	3	0	8	8	6

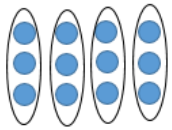
	8	9	9		
	8	~~9~~	~~0~~	~~0~~	15 6
-	2	8	4	5	7 4
	6	0	5	4	8 2

				  	**Subtracting Decimals** 		

Multiplication	**Pitch**	solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher	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 multiplication (×), division (÷) and equals (=) signs Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot	Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods	recall multiplication and division facts for multiplication tables up to 12 × 12 use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers recognise and use factor pairs and commutativity in mental calculations multiply two-digit and three-digit numbers by a one-digit number using formal written layout	Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers Multiply and divide numbers mentally drawing upon known facts Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000	Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context
	Method	All Using 2s, 5s and 10 times tables **Identifying Equal Groups**  **Repeated Addition Linked to Picture** 2 + 2 + 2 = 6	All Using 2s, 3s, 5s and 10 times tables **Numicon**  **Models and Images**  There are ___ equal groups with ___ in each group. I have five ___. **Drawing Pictures** 	**Place Value Counters** 23 x 5 =  100 + 15 = 115 **Bar Model** 7 x 7 =49  	**Multiply by 10, 100 and 1000** Use a place value grid to multiply by 10, 100 and 1000. Children should understand that the numbers move places – they don't add zeros.  **Place Value Counters** 23 x 5 =  100 + 15 = 115	**Expanded Multiplication**  	**Short Multiplication**  **Long Multiplication 2dig x 2dig**  **3dig x 2dig** 

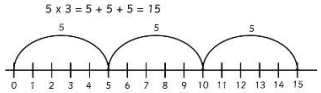
Arrays

4 x 3 = 12



3 + 3 + 3 + 3 = 12

Repeated addition



Bar Models

Partitioning

24 x 3 =

20 4

20 x 3 = 60

4 x 3 = 12

72

56 x 5 =

50 6

50 x 5 = 250

6 x 5 = 30

280

132 x 3 =

100s	10s	1s
100	10 10 10	1 1
100	10 10 10	1 1
100	10 10 10	1 1

300 + 90 + 6 = 396

Expanded Column Multiplication

		4	7
x			5
		3	5
	2	0	0
	2	3	5

		2	3	4
x				3
			1	2
			9	0
		6	0	0
		7	0	2

		5	6
x		2	3
		1	8
	1	5	0
	1	2	0
1	0	0	0
1	2	8	8

		5	5	6
x			2	3
			1	8
		1	5	0
	1	5	0	0
		1	2	0
	1	0	0	0
1	0	0	0	0
1	2	7	8	8

Short Multiplication (2/3digt x 1 digit only)

	2	4	3
x			4
	9	7	2

(1 1)

	5	7	6
x			4
2	3	0	4

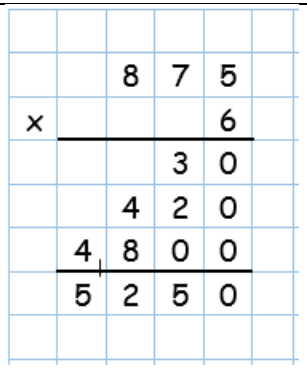
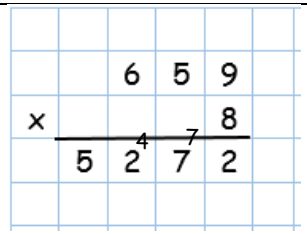
(3 2)

4dig x 2dig

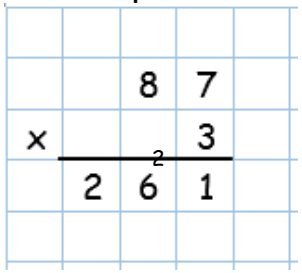
	2	3	6	4
x			2	3
	7	0	9	2
6	7	2	8	0
7	5	3	7	2

3dig x 3dig

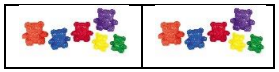
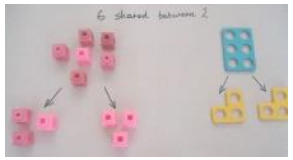
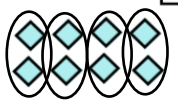
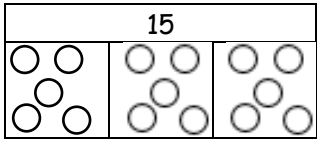
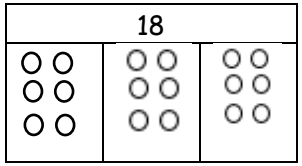
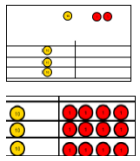
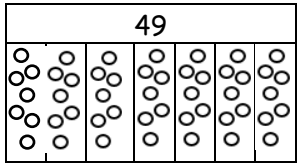
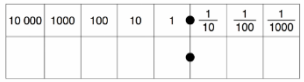
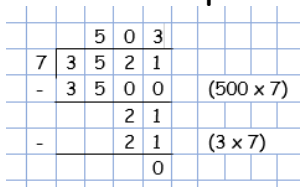
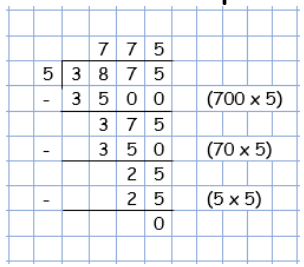
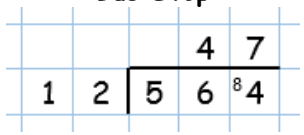
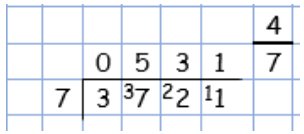
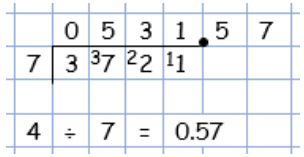
		2	8	3	
x		6	3	5	
	1	4	1	5	
	8	4	9	0	
1	6	9	8	0	0
1	7	9	2	0	5

Compact Column Multiplication

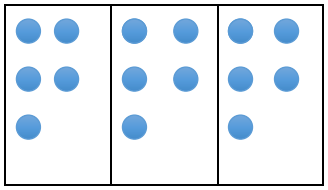


7 x 3 = 21 – place the 1 in the ones column and place the 2 in the tens column.
3 x 8 = 24 – add the 2 that had been brought up to 24 to make this 26 and place this in the columns.

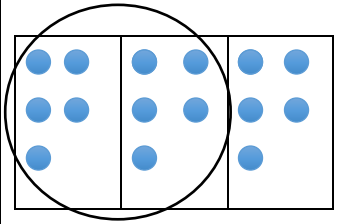
Division	**Pitch**	solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher	Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot	Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods	recall multiplication and division facts for multiplication tables up to 12 × 12 use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers recognise and use factor pairs and commutativity in mental calculations multiply two-digit and three-digit numbers by a one-digit number using formal written layout	Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers Multiply and divide numbers mentally drawing upon known facts Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000	Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context
	Method	**Halving** 10 ÷ 2 = 5  **Sharing** 6 ÷ 2 =  **Grouping** 6 ÷ 2 	**Sharing Objects** 15 ÷ 3 = 5 **Grouping Objects** 8 ÷ 2 = □  **Bar Model** 15 ÷ 3 =  **Inverse** Use of times table knowledge and the inverse. Eg. 5 x 4 = 20 so 20 ÷ 4 = 5 20 ÷ 5 = 4	**Sharing (Bar Model)** 18÷3 =  **Place Value Counters** 42 ÷ 3= 14  1. Make 42. Share the 4 tens between 3. Can we make an exchange with the extra 10? Exchange the ten for 10 ones and share out 12 ones	**Sharing (Bar Model)** 49 ÷ 7 =  **Dividing by 10, 100 and 1000** Use of place value grid.  **Related Division Facts** 45 ÷ 5 = 9 450 ÷ 5 = 90 4500 ÷ 5 = 900	**Expanded Method – Clear Multiple**  **Expanded Method – Unclear Multiple** 	**Bus Stop**  **Bus Stop converting Remainder to fractions**  **Bus Stop converting Remainder to decimal** 

Finding Fractions of Amounts

1/3 of 15 = 5



2/3 of 15 = 10



Expanded Method – Clear Multiple

		9	0	6	
4	4	5	3	0	
-	4	5	0	0	(900 x 5)
			3	0	
		-	3	0	(6 x 5)
				0	

Expanded Method – Unclear Multiple

			7	7	5	
5	3	8	7	5	
-	3	5	0	0	(700 x 5)
			3	7	5	
-		3	5	0	(70 x 5)
				2	5	
-				2	5	(5 x 5)
					0	

Expanded Method – Unclear Multiple with Remainder

		1	0	5	8	r	2
4	4	2	3	4			
-	4	0	0	0			(1000 x 4)
			2	3	4		
-			2	0	0		(50 x 4)
				3	4		
-				3	2		(8 x 4)
					2		

Bus Stop

Expanded Method – Unclear Multiple

		5	3	1	r	4
7	3	7	2	1		
-	3	5	0	0		(500 x 7)
		2	2	1		
-		2	1	0		(30 x 7)
			1	1		
-				7		(1 x 7)
				4		

Bus Stop

	2	3	5	÷	5	=	
			4	7			
5	2	$^{2}3$	$^{3}5$				

	0	5	3	1	r	4
7	3	$^{3}7$	$^{2}2$	$^{1}1$		

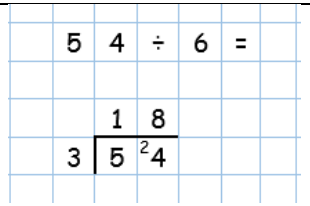
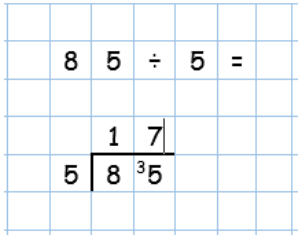
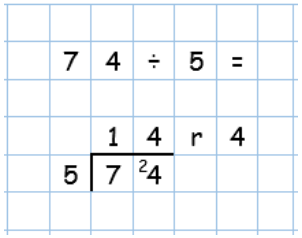
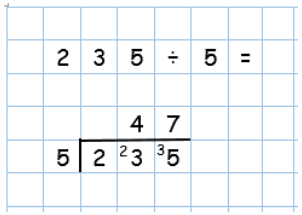
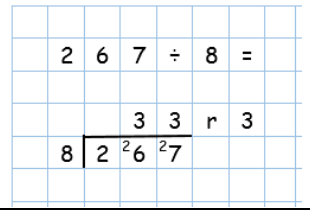
	2	6	7	÷	8	=	
			3	3	r	3	
8	2	$^{2}6$	$^{2}7$				

Long Division – Dividing by a 2 digit number

			1	0	2	r	1	7
2	5	2	5	6	7			
	-	2	5	0	0			(100 x 25)
				6	7			
	-			5	0			(2 x 25)
				1	7			

						$\frac{17}{25}$
			1	0	2	
2	5	2	5	6	7	
	-	2	5	0	0	(100 x 25)
				6	7	
	-			5	0	(2 x 25)
				1	7	

			1	0	2.6	8	
2	5	2	5	6	7		
	-	2	5	0	0		(100 x 25)
				6	7		
	-			5	0		(2 x 25)
				1	7		

					 54÷6= 18 3 5 24  85÷5= 17 5 8 35  74÷5= 14 r 4 5 7 24  235÷5= 47 5 2 23 35  267÷8= 33 r 3 8 2 26 27		