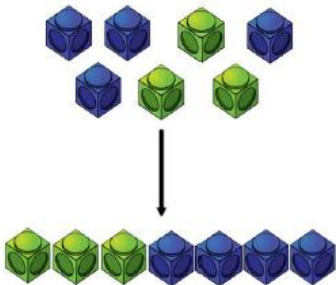
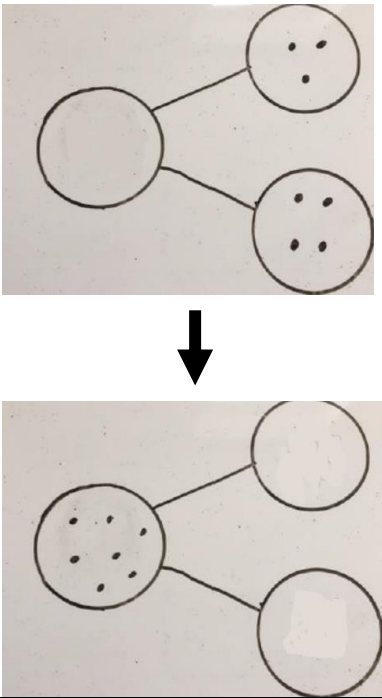
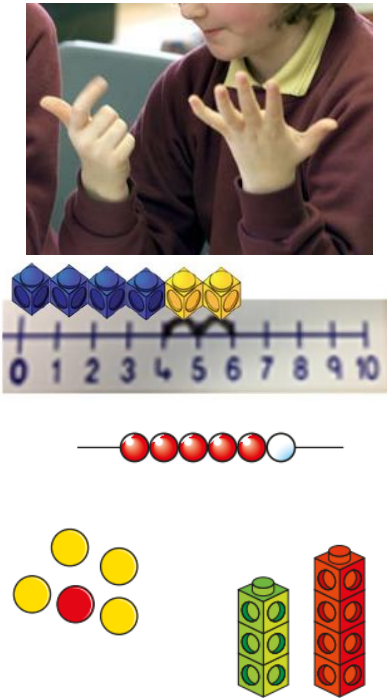
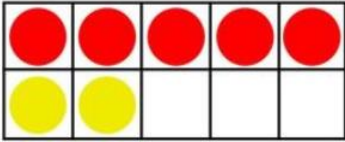
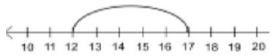
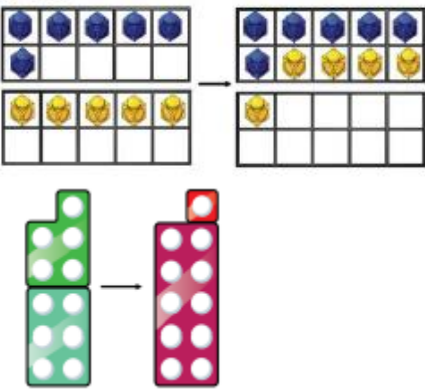
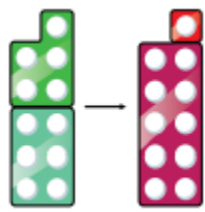
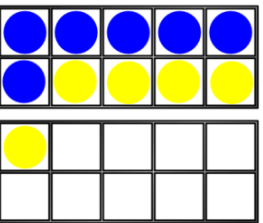
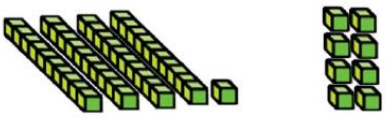
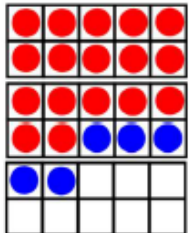
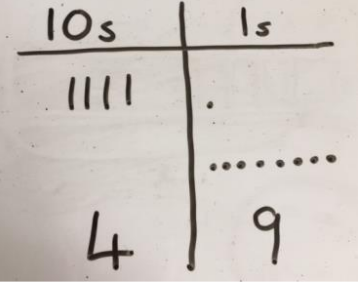
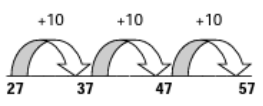
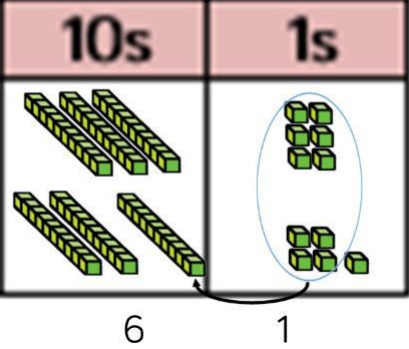
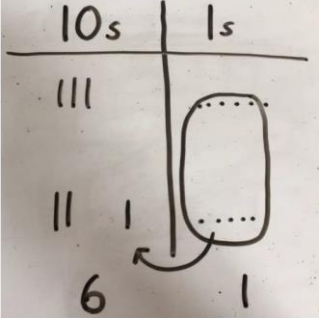
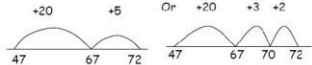
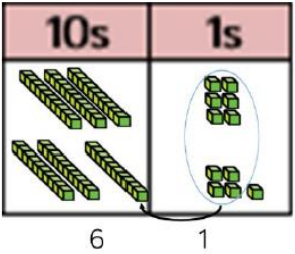
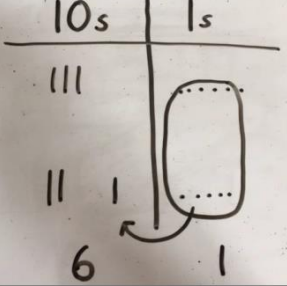
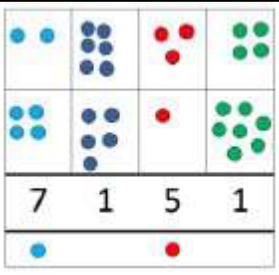
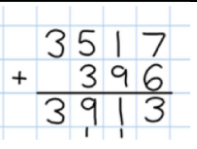
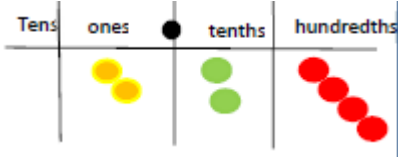
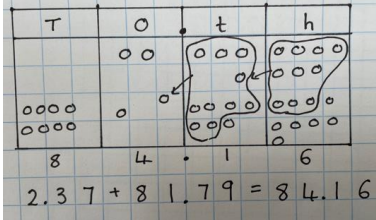
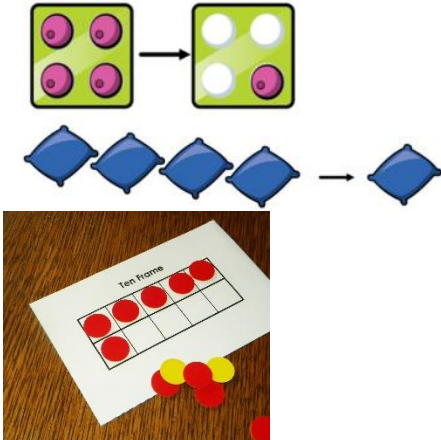
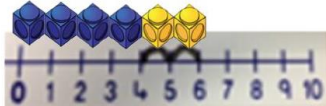
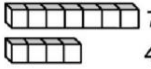
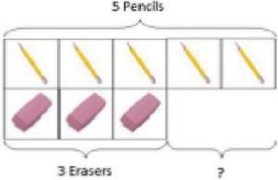
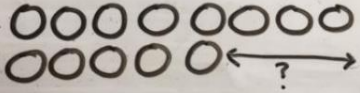
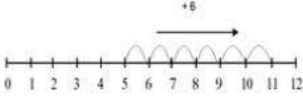
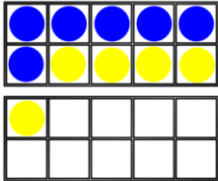
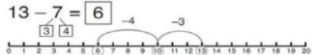
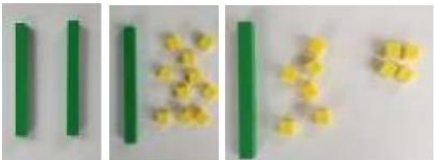
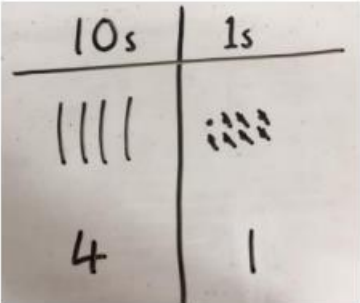
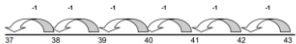


	Addition		
	Concrete	Pictorial	Abstract
R - Combining two parts to make a whole			$3 + 4 = 7$ 3 is a part, 4 is a part and the whole is 7.
YR1 - Counting on from the biggest number		$5 + 2 = 7$  	 $12 + 5 = 17$ Reinforce starting from the largest number. $7 + 3 = 10$ Encourage recall of known number facts to develop fluency in mental calculations.

YR1 - Regrouping to make 10	6 + 5  	Children to draw the ten frame and counters/cubes. 	7+4=11 I have 7, how much more do I need to make 10? How much more do I add on now?
YR2 - Adding 2-digit number and ones	  17 + 5 = 22 Use ten frame to make 'magic ten' Children explore the pattern. 17 + 5 = 22 27 + 5 = 32		41 + 8 = 1 + 8 = 9 40 + 9 = 49
YR2 - Add 2-digit number and tens	 25 + 10 = 35 Explore that the ones digit does not change	Chn to draw deines in PV chart	27+30  27 + 10 = 37 27 + 20 = 47 27 + □ = 57

YR2 – Adding 2 2-digit numbers	36 + 25 		 $ \begin{array}{r} 25 + 47 \\ \swarrow \quad \searrow \\ 20 + 5 \quad 40 + 7 \\ 20 + 40 = 60 \\ 5 + 7 = 12 \\ 60 + 12 = 72 \end{array} $
Yr3 - Add two two-digit numbers then three-digit numbers with no exchanges and then making at least one exchange			$ \begin{array}{r} 20 + 5 \\ 40 + 8 \\ 60 + 13 = 73 \end{array} $ Start by partitioning the numbers before formal column to show the exchange. $ \begin{array}{r} 536 \\ + 85 \\ \hline 621 \\ 11 \end{array} $
Y4 – Add numbers with up to 4 digits.			

Y5– Add numbers with more than 4 digits, including decimals (2dp) / money Y6 – Add several numbers of increasing complexity, including decimal numbers.			2.66 + 3.40 6.06 1 21467 + 5762 27229 111
Subtraction			
	Concrete	Pictorial	Abstract
R- physically taking away and removing objects from a whole	4 - 3 = 1 	 If I take two cakes away. How many are left?	
Y1 – Counting back to subtract 1 or 2-digit numbers within 20	 Move objects away from the group, counting backwards.  Move the beads along the bead string as you count backwards.	 6 - 2 = 4	Put 6 in your head, count back 2. What number are you at? There are 7 people on the bus and 4 people get off. How many are on the bus? 

Y1 – Find the difference to subtract 1 or 2-digit numbers within 20	Compare objects and amounts  7 'Seven is 3 more than four' 4 'I am 2 years older than my sister'  5 Pencils 3 Erasers ? Lay objects to represent bar model. 		Hannah has 12 sweets and her sister has 5. How many more does Hannah have than her sister? Count on using a number line to find the difference. 
Y1 – making 10	 14-5=9 Make 14 on the ten frame or with different coloured cubes to represent the ten and the ones. Take away the four first to make 10 and then takeaway one more so you have taken away 5. You are left with the answer of 9.	Chn to draw the counters in tens frames. 	15 – 7= How many do we subtract to reach the next 10? How many do we have left to subtract? 13 – 7 = 6 
Y2 – 2-digit number subtract ones	20 – 4 = 16  Regrouping a ten into 10 ones	48 – 7 = 41 	42 – 6 = 36 

Y2 – 2-digit number subtract 2-digit number	34 – 13 =	Chn to draw the deines in books. They should subtract the ones and then the tens to prepare for formal subtraction.	Subtracting tens Then progressing to tens and ones I have 43 cm of ribbon and use 25 cm. How much is left? Moving onto more efficient jumps – teaching children to cross a tens bounda																
Y3 - subtract numbers mentally: 3-digit number - ones 3-digit number - tens 3-digit number - hundreds	461 – 20 <table><tr><td>Hundreds</td><td>Tens</td><td>Ones</td></tr><tr><td> </td><td> </td><td> </td></tr></table>	Hundreds	Tens	Ones				Children to draw a representation of deines in place value charts. <table><tr><td>Hundreds</td><td>Tens</td><td>Ones</td></tr><tr><td> </td><td> </td><td> </td></tr></table>	Hundreds	Tens	Ones				920 – 50 Vary the position of the answer and question. Expose children to missing number questions and vary the missing part of the calculation. 678 = ? - 1 688 – 10 = ? 678 = ? – 100				
Hundreds	Tens	Ones																	
Hundreds	Tens	Ones																	
Y4 mental subtraction with up to 4 digits	: 3,454 – 1,224 <table><tr><td>Th</td><td>H</td><td>T</td><td>O</td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr></table>	Th	H	T	O					Chn to draw counters in a place value chart in books <table><tr><td>Th</td><td>H</td><td>T</td><td>O</td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr></table>	Th	H	T	O					
Th	H	T	O																
Th	H	T	O																

Y3 formal subtraction with up to 3 digits including exchanges.

Y4 – as year 3 but with up to 4 digits

		H	T	O
		3	6	8
	-	1	3	4
		2	3	4

I now have ____.

hundreds	tens	ones
		

Chn to draw Deines or
counters in a place value chart
in books

$$\begin{array}{r} 359 \\ - 124 \\ \hline 235 \end{array}$$

		H	T	O
		4	5	3
	-	1	7	8

		H	T	O
				1
		4	8	3
-		1	7	8
				5

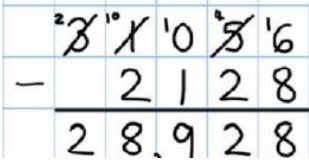
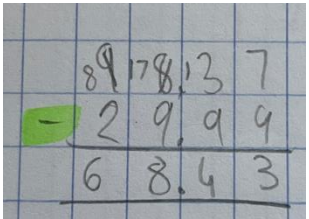
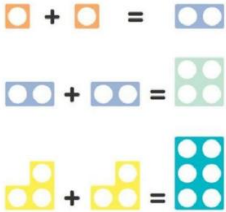
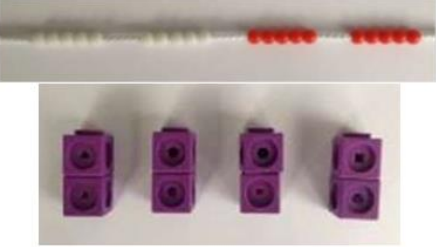
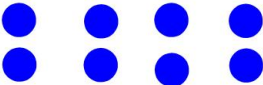
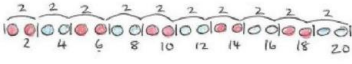
$$: 2,343 - 151$$

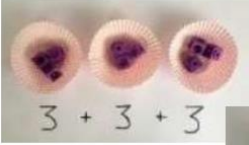
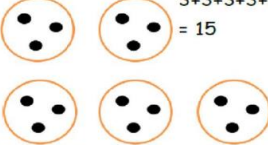
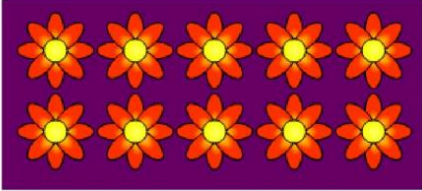
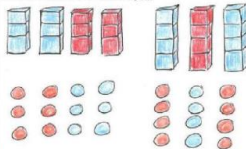
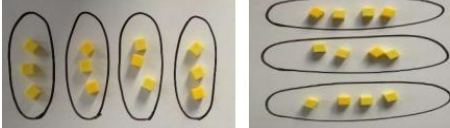
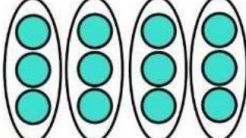
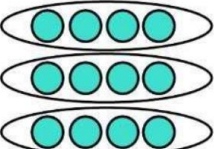
Th	H	T	O
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	100	10 10	1
		10 10	
		10 10	
		10 10	
		10 10	
		10 10	

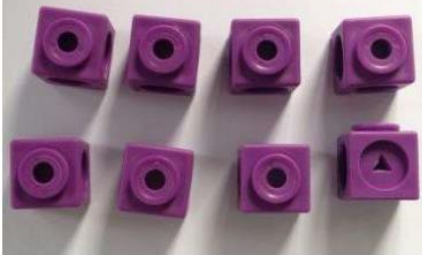
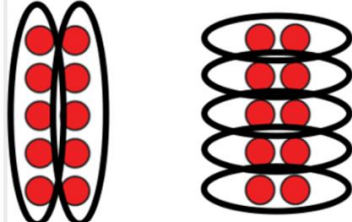
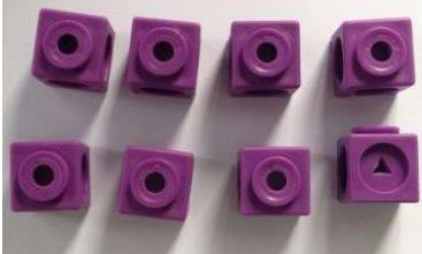
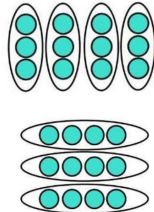
Chn to draw Deines or
counters in a place value chart
in books and show exchanges.

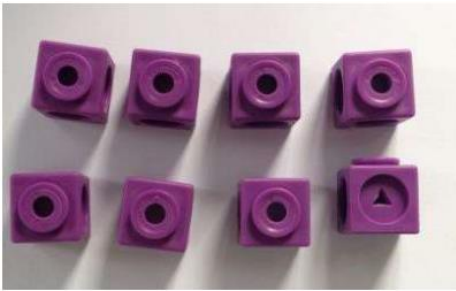
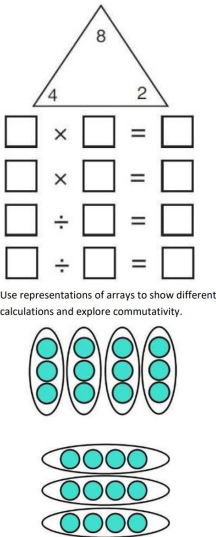
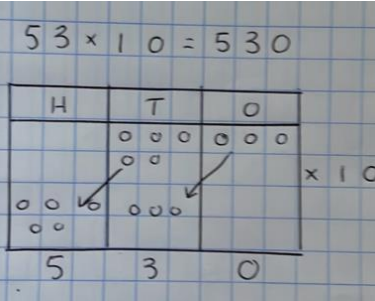
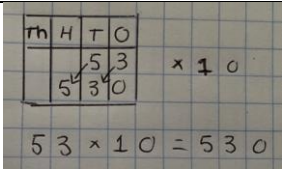
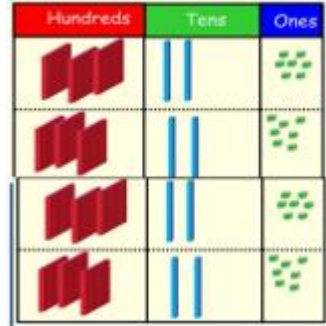
H	T	O
☐ ☒ ☐	☐ ☒ ☒ ☒	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☒ ☒ ☒
2	1	8

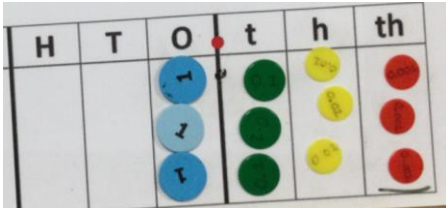
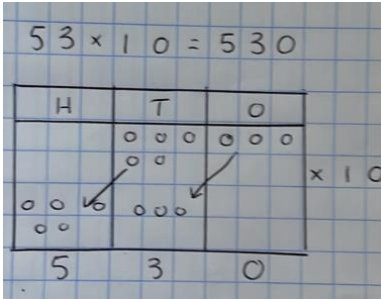
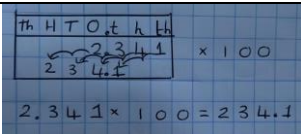
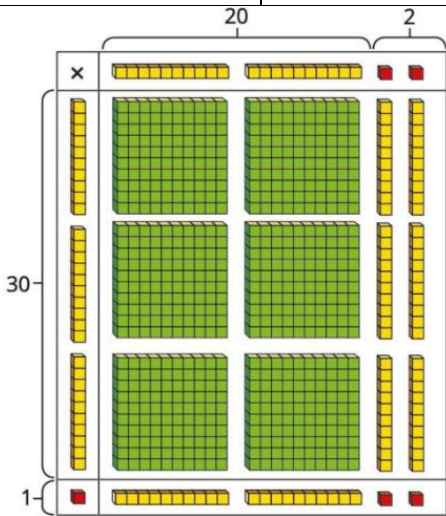
$$\begin{array}{r} 3 \overset{3}{\cancel{4}} \overset{1}{1} \\ - 123 \\ \hline 218 \end{array}$$

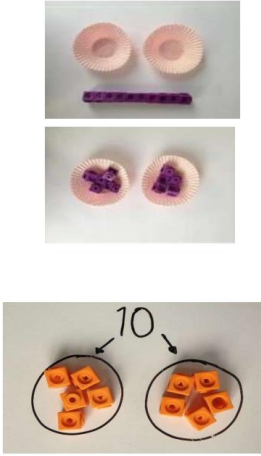
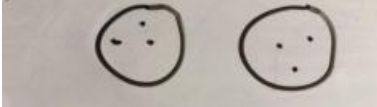
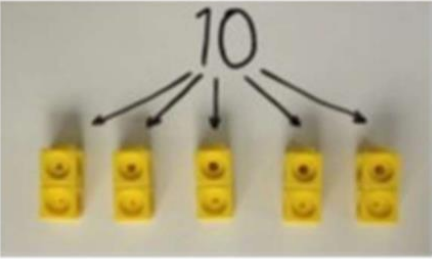
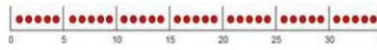
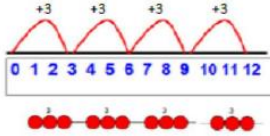
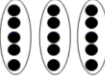
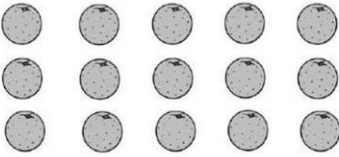
Y5- Subtract numbers with more than 4 digits, including decimals for money and measures. 6—Subtract with increasingly large and more complex numbers and decimal values (up to 3 decimal place)	As year 4 – using PV counters	Chn to draw counters in a place value chart in books and show exchanges.	 
	Multiplication		
	Concrete	Pictorial	Abstract
Y1 – doubling numbers up to 10		Double 4 is 8 	Double 4 is 8
Y1 - Count in multiples of twos, fives and tens. Solve one step problems involving multiplication through grouping with arrays		 Children make representations to show counting in multiples. 	Count in multiples of a number aloud. Write sequences with multiples of numbers. 2, 4, 6, 8, 10 5, 10, 15, 20, 25, 30

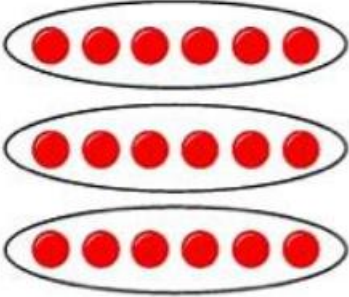
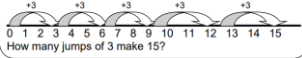
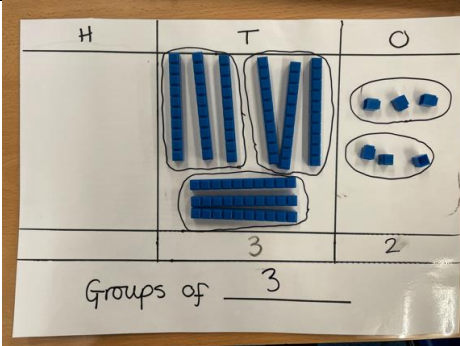
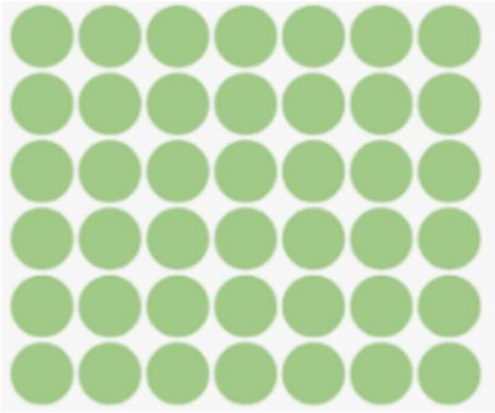
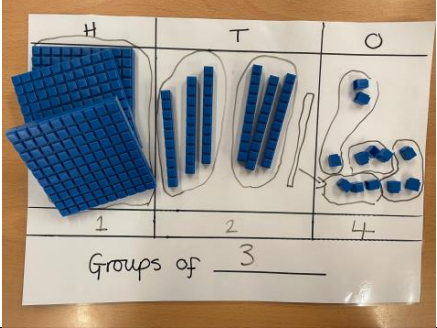
Y1 – understand multiplication as repeated addition	  	 	 $2 + 2 + 2 + 2 + 2 = 10$
Y2 – times tables facts for 2, 5 and 10 times tables	Use objects laid out in arrays to find the answers to 2 lots 5, 3 lots of 2 etc. 	Draw representations of arrays to show understanding 	$3 \times 2 = 6$ $2 \times 5 = 10$
Y2 - Multiplication is commutative		Use representations of arrays to show different calculations and explore commutativity.  	Use an array to write multiplication sentences and reinforce repeated addition.  $5 + 5 + 5 = 15$ $3 + 3 + 3 + 3 + 3 = 15$ $5 \times 3 = 15$ $3 \times 5 = 15$

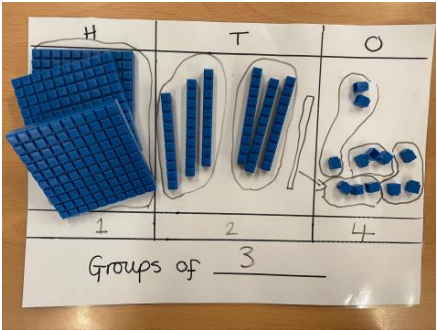
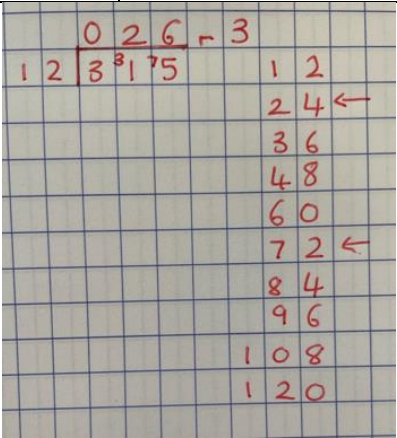
Y2 – Use of inverse (this should be taught alongside division so chn know how they work together)			$\begin{array}{c} 8 \\ \hline 4 \quad 2 \end{array}$ $\begin{array}{l} \square \times \square = \square \\ \square \times \square = \square \\ \square \div \square = \square \\ \square \div \square = \square \end{array}$ $2 \times 4 = 8$ $4 \times 2 = 8$ $8 \div 2 = 4$ $8 \div 4 = 2$ $8 = 2 \times 4$ $8 = 4 \times 2$ $2 = 8 \div 4$ $4 = 8 \div 2$ Show all 8 related fact family sentences.																		
Y3 - times tables facts for 3, 4 and 8 times tables		Use representations of arrays to show different calculations and explore commutativity. 	$\begin{array}{c} 8 \\ \hline 4 \quad 2 \end{array}$ $\begin{array}{l} \square \times \square = \square \\ \square \times \square = \square \\ \square \div \square = \square \\ \square \div \square = \square \end{array}$ $2 \times 4 = 8$ $4 \times 2 = 8$ $8 \div 2 = 4$ $8 \div 4 = 2$ $8 = 2 \times 4$ $8 = 4 \times 2$ $2 = 8 \div 4$ $4 = 8 \div 2$ Show all 8 related fact family sentences.																		
Y3 – multiply 2-digit by 1-digit	Show the links with arrays to first introduce the grid method. <table><tr><td>x</td><td>10</td><td>3</td></tr><tr><td>4</td><td></td><td></td></tr></table> 4 rows of 10 4 rows of 3 Move onto base ten to move towards a more compact method. <table><tr><td>x</td><td>T</td><td>U</td></tr><tr><td>4</td><td></td><td></td></tr></table> 4 rows of 13	x	10	3	4			x	T	U	4			Chn to draw Deines in books in grid.	35 books were sold. Each book cost £4. How much money was taken? <table><tr><td>x</td><td>30</td><td>5</td></tr><tr><td>4</td><td>120</td><td>20</td></tr></table> $120+20=£140$	x	30	5	4	120	20
x	10	3																			
4																					
x	T	U																			
4																					
x	30	5																			
4	120	20																			

Y4 – times tables facts up to 12 x 12		 Use representations of arrays to show different calculations and explore commutativity.	$2 \times 4 = 8$ $4 \times 2 = 8$ $8 \div 2 = 4$ $8 \div 4 = 2$ $8 = 2 \times 4$ $8 = 4 \times 2$ $2 = 8 \div 4$ $4 = 8 \div 2$ Show all 8 related fact family sentences.
Y4 – multiply numbers up to 1000 by 10 and 100	Chn to manipulate counters in place value charts. 	Chn to draw counters in a place value chart and move them to new column before redrawing them. 	
Y4 – multiply 2 and 3-digit numbers by 1-digit number using formal method.	It is important at this stage that they always multiply the ones first. 	Children to draw deines or counters in books as shown with the concrete resources.	Expanded method leading to short multiplication. $\begin{array}{r} 48 \\ \times 4 \\ \hline 32 \text{ (4x8)} \\ 160 \text{ (40x4)} \\ \hline 192 \end{array}$
Y5 – short (formal) multiplication of 4-digit by 1-	As per year 4	As per year 4	$\begin{array}{r} 23 \\ \times 6 \\ \hline 138 \\ 11 \end{array}$

Y5 – multiply whole numbers and decimals by 10, 100 and 1000 Yr 6 - (including 3dp)	Chn to manipulate counters in place value charts. 	Chn to draw counters in a place value chart and move them to new column before redrawing them (inc. decimals) 	
Y5 – long(formal) multiplication of up to 4-digit by 2-digit numbers Y6 – including 1-digit numbers with up to 2dp by 2-digit numbers		$\begin{array}{r} 18 \\ \times 13 \\ \hline 54 \\ 180 \\ \hline 234 \end{array}$	
Division			
	Concrete	Pictorial	Abstract
R – through practical activities and discussion, children will begin to solve halving and sharing problems.	 Share the cakes between 2 people. 'Half of the cakes are for you and half of the cakes are for me.'		

Y1 – Find half by sharing into 2 equal groups			10 shared between 2 is 5
Y1 – solve division problems by grouping objects, numbers and quantities	How many groups of 2 cubes can you make from 10 cubes? 	How many groups of 5 counters can you make from 35 counters? 	There will be 4 cakes on each plate. 
Y2 - Recall division facts for the 2, 5 and 10 multiplication tables division using arrays – division through sharing	 20 crayons are shared between 2 pots.	 Sharing: '20 crayons are shared between 2 pots.'	$20 \div 2 = 10$
Y2 - Recall division facts for the 2, 5 and 10 multiplication tables division using arrays – division through grouping	Children arrange cubes into arrays:   How many groups of 3 are in 15? Children need to understand that this represents $15 \div 3$ They also need to understand that this represents $15 \div 5 = 3$ when represented horizontally.	Draw an array and use lines to split the array into groups to make multiplication and division sentences 	$15 \div 5 = 3$ Dividend $\div$ divisor = quotient

Y3 – division facts for 3, 4, and 8 times tables		A CD costs £3. How many CD's can I buy with £18?  How many jumps of 3 make 18? dividend divisor quotient $18 \div 3 = 6$
Y3 – short method for 2-digit divided by 1-digit number, progressing to limited exchanges and remainders		Drawing PV chart and deines to show grouping. $3 \overline{) 32}$
Y4 - Recall division facts for multiplication tables up to 12x12		$\begin{array}{c} 42 \\ \triangle \\ X \div \\ \hline 7 \quad 6 \end{array}$ ___ X ___ = ___ ___ X ___ = ___ ___ ÷ ___ = ___ ___ ÷ ___ = ___
Y4 – short method for 2-digit divided by 1-digit number, progressing to increasing exchanges and remainders		Drawing PV chart and deines to show grouping. $183 \div 7 = 26 \text{ r}1$ $7 \overline{) 183}$

Y5 - Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders in context		Drawing PV chart and deines to show grouping.	$183 \div 7 = 26 \text{ r}1$ $\begin{array}{r} 26 \text{ r}1 \\ 7 \overline{) 183} \end{array}$
Y6 - Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where	When children start to divide by 2-digits, they should be confident with the abstract:		
Y6 - Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division	When children start to use long division, they should be confident with the abstract:		