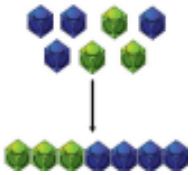
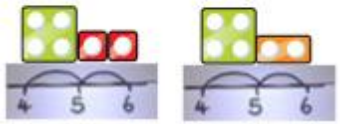
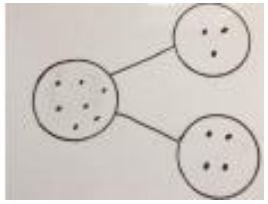
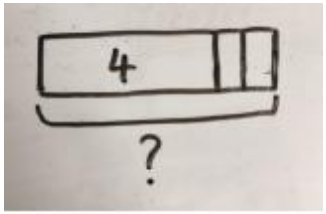
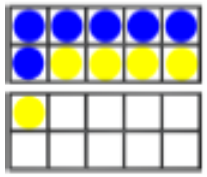
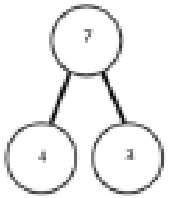
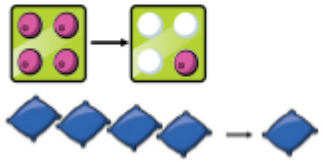
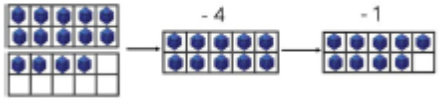
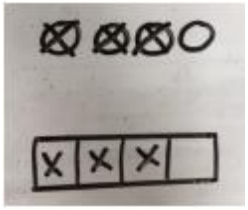
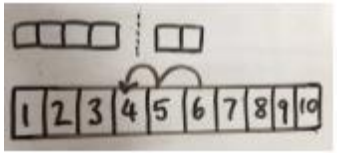
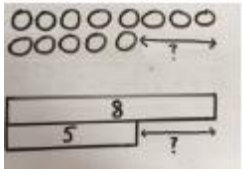
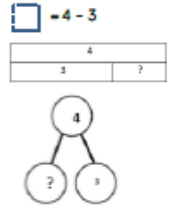
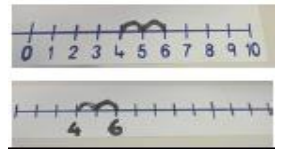
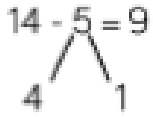
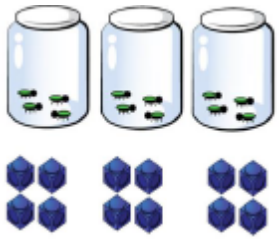
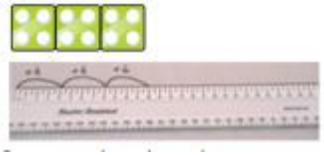
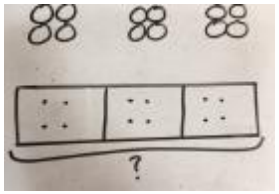
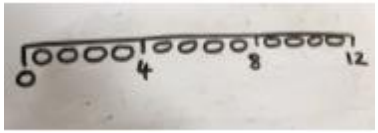
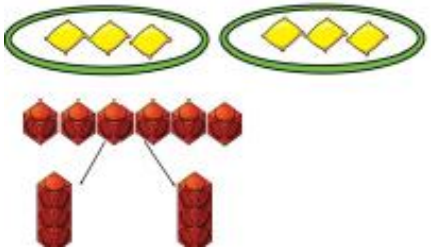
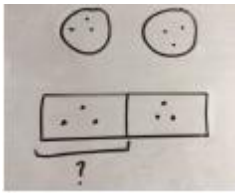
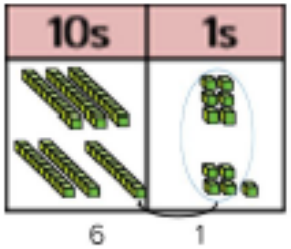
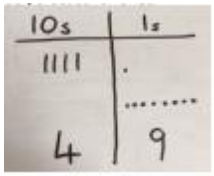
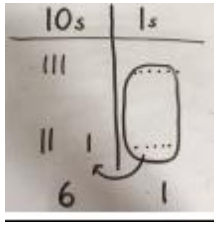
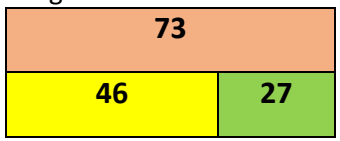
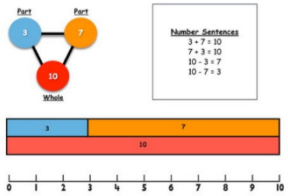
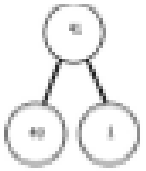
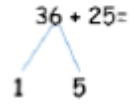
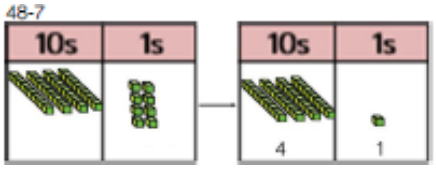
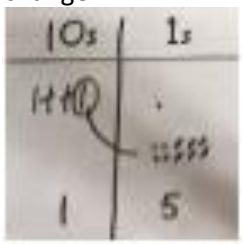
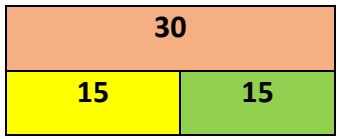
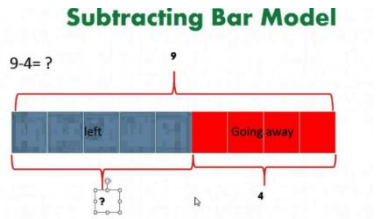
Kea Community Primary School Calculation Policy 2018

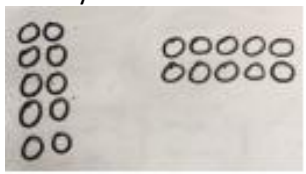
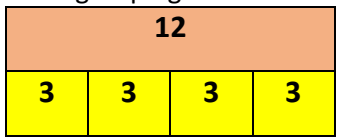
	Mental Calculation	Concrete	Pictorial	Abstract
Y1 +	Number bonds ('story' of 5, 6, 7, 8, 9, 10 and within 20) Count on in 1s from a given 2-digit number Add two 1-digit numbers Add three 1-digit numbers, spotting doubles or pairs to 10 Count on in 10s from any given 2-digit number Add 10 to any given 2-digit number Use number facts to add 1-digit numbers to 2-digit numbers including missing number sentences. e.g. *Use 4 + 3 to work out 24 + 3, 34 + 3* *e.g. 16+ □ = 20* Add by putting the larger number first Combining two parts to make a whole: part whole model. Starting at the bigger number and counting on- using cubes. Regrouping to make 10 using ten frame.	Combining two parts to make a whole (use cars, teddies shells etc)  Counting on using number lines, cubes or Numicon.   Regrouping to make ten, using ten frames and counters/cubes or Numicon. 	Children to represent the cubes using dots or crosses. They could put each part on a part-part whole model too.  A bar model which encourages the children to count on, rather than count all.  Children to draw the ten frame and counters or cubes 	41 + 8 add as 1 + 8 = 9 40 + 9 = 49  The 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=  Children to develop an understanding of equality e.g. $6 + \square = 11$ $6 + 5 = 5 + \square$ $6 + 5 = \square + 4$

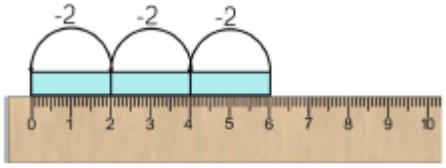
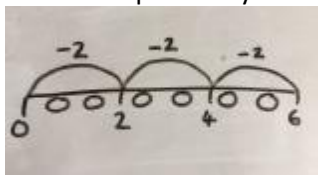
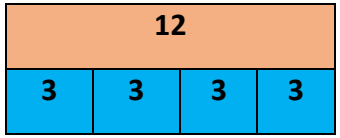
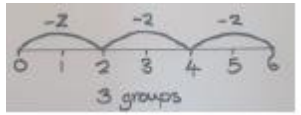
Y1 -	Number bonds ('story' of 5, 6, 7, 8, 9, 10 and within 20)) Count back in 1s from a given 2-digit number Subtract one 1-digit number from another Count back in 10s from any given 2-digit number Subtract 10 from any given 2-digit number including missing number sentences. Use number facts to subtract 1-digit numbers from 2-digit numbers from 20 e.g. *Use 7 – 2 to work out 27 – 2, 37 – 2* Taking away ones Counting back Find the difference Part whole model Make 10 using the ten frame	Physically taking away and removing objects from a whole (ten frames, Numicon, beads, cubes etc) 4 - 3 = 1  Counting back (using number line or number track) children start with 6 and count back 2 6 - 2 = 4  Finding the difference (using cubes, Numicon, Cuisenaire rods etc). Calculate the difference between 8 and 5.  Making ten using ten frames. 14 - 5 	Children draw the concrete resources they are using and cross out the correct amount. The bar model can also be used.  Children to represent what they see pictorially.  Children to draw the cubes (or other concrete objects they have used) or use the bar model to show what they need to calculate.  Children present ten frame pictorially and discuss making 10. 	4-3=  Children to represent the calculation on a number line or number track and show their jumps. Encourage children to use the empty number line.  Find the difference between 8 and 5 8 – 5, the difference is ☐ Children to show how they can make 10 by partitioning the quantity or number taken away  14 – 4 = 10 10 – 1 = 9

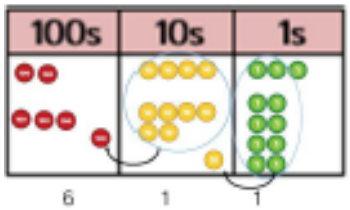
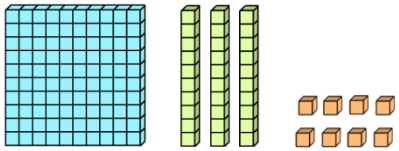
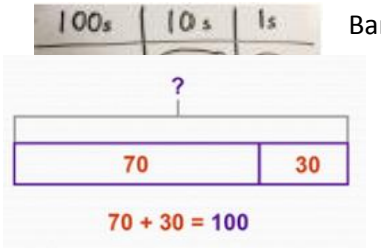
Y1 x	Begin to count in 2s, 5s and 10s Begin to say what three 5s are by counting in 5s, or what four 2s are by counting in 2s, etc. Double numbers to 10 Solve missing number problems Recognising and making equal groups. Doubling Counting in multiples Use cubes, Numicon and other objects in the classroom	Repeated grouping or repeated addition: 3x4 or 4+4+4 or There are 3 equal groups with 4 in each group.  Number lines to show repeated groups. 	Children represent practical resources in a picture and use a bar model.  Represent this pictorially alongside a number line. 	Abstract number line showing three jumps of four. 
Y1 ÷	Begin to count in 2s, 5s and 10s Find half of even numbers to 12 and know it is hard to halve odd numbers Find half of even numbers by sharing Begin to use visual and concrete arrays or 'sets of' to find how many sets of a small number make a larger number Solve missing number problems Sharing objects into groups Division as grouping e.g. I have 12 sweets and put them in groups of 3, how many groups? Use cubes and draw round 3 cubes at a time.	Sharing using a range of objects. 6 ÷ 2 	Represent the sharing pictorially. 	Children encouraged to use their 2 times table facts 6 ÷ 2 = 3 

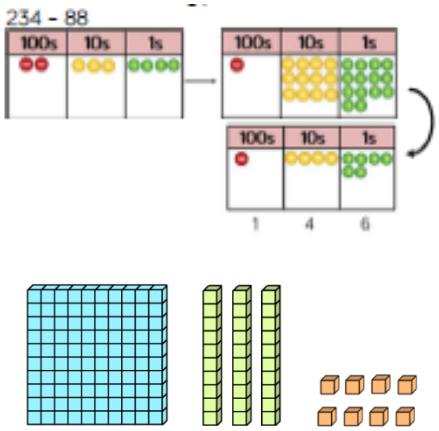
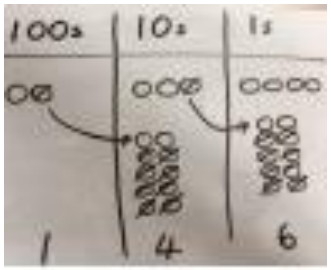
Y2 +	Number bonds – know all the pairs of numbers which make all the numbers to 12, and pairs with a total of 20 Count on in 1s and 10s from any given 2-digit number Add three or more 1-digit numbers Add a 1-digit number to any 2-digit number using number facts, including bridging multiples of 10 e.g. *45 + 4* e.g. *38 + 7* Add 10 and small multiples of 10 to any given 2-digit number Add any pair of 2-digit numbers Begin to understand inverse operations and commutativity through missing number sentences and bar models Adding three single digits. Use of base 10 to combine two numbers.	TO + 0 using base 10. Continue to develop understanding of partitioning and place value. 41 + 8  10s and 1s + 10s and 1s using base 10. Continue developing understanding of partitioning and place value. 36 + 25 	Children to represent the base 10 e.g. lines for 10s and dots for 1s  Children to represent the base 10 in a place value chart.  Use the bar model for adding two 2 digit numbers.  	 41+8 Looking for ways to make 10.  36+25= 61 1 1 +2 9 1 0 3 0 4 0

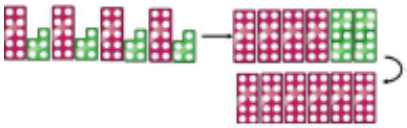
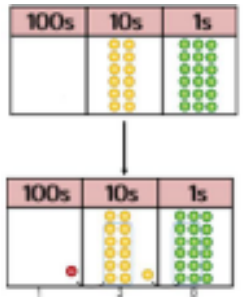
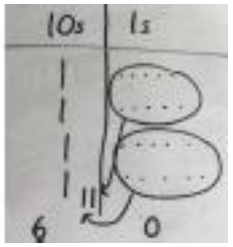
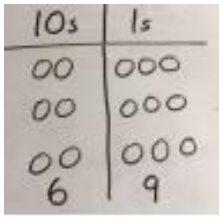
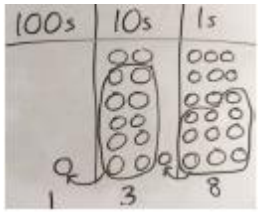
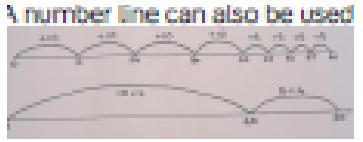
Y2 -	Number bonds – know all the pairs of numbers which make all the numbers to 20 Count back in 1s and 10s from any given 2-digit number Subtract a 1-digit number from any 2-digit number using number facts, including bridging multiples of 10 e.g. *56 – 3* e.g. *53 – 5* Subtract 10 and small multiples of 10 from any given 2-digit number Subtract any pair of 2-digit numbers by counting back in 10s and 1s (when no regrouping is required) or by counting up Begin to understand inverse operations through missing number sentences and bar models. Counting back Find the difference Part whole model Make 10 Use of base 10	Column method using base 10. 	Represent the base 10 pictorially, remembering to show the exchange.  Use the bar model to show inverse of addition.  	Horizontal number sentences including missing number problems 30-15=15 15=30-15 30-☐=15

Y2 x	Know the x2,x5 and x10 tables Begin to know x3 and x4 tables Begin to understand that multiplication is repeated addition and to use arrays e.g. *3 × 4 is three rows of 4 dots* Begin to learn the associated division facts for know tables eg how many 2s are there in 16? Double numbers up to 20 and know corresponding halves. Begin to understand inverse operations and commutativity through missing number sentences and bar models Arrays- showing commutative multiplication	Use arrays to show commutativity (counters and other concrete objects can be used) 5 x 2 = 2 x 5  	Children represent arrays pictorially.  Children use the bar model to show grouping.  	Horizontal number sentences including missing number problems 3x4=12 3x☐=12

Y2 ÷	Know the x2,x5 and x10 tables Begin to know x3 and x4 tables Begin to learn the associated division facts for know tables eg how many 2s are there in 16? Using fingers, say where a given number is in the 2s, 5s or 10s count e.g. *8 is the fourth number when I count in 2s* Relate division to grouping e.g. *How many groups of 5 in 15?* Halve even numbers to 20 Begin to halve numbers to 40 and multiples of 10 to 100 Find $^1/_2$, 2/4, $^1/_3$, $^1/_4$ and $^3/_4$ of a quantity of objects and of amounts (whole number answers) Must know that in fractions all parts of the whole should be equal. Division as grouping Division within arrays- linking to multiplication Repeated subtraction	Repeated subtraction using Cuisenaire rods above a ruler. 6 ÷ 2 = 3  3 groups of 2	Children represent repeated subtraction pictorially.  Children use bar model to represent repeated subtraction.  	Abstract number line to show the equal groups that have been subtracted.  Horizontal number sentences including missing number problems 10÷5=2 2=10÷5 10÷☐=2

Y3+	Know pairs with each total to 20 e.g. *2 + 6 = 8,* *12 + 6 = 18,* *7 + 8 = 15* Know pairs of multiples of 10 with a total of 100 Add any two 2-digit numbers by counting on in 10s and 1s or by using partitioning Add multiples and near multiples of 10 and 100 Perform place-value additions without a struggle e.g. *300 + 8 + 50 = 358* Use place value and number facts to add a 1-digit or 2-digit number to a 3-digit number e.g. *104 + 56 is 160 since 104 + 50 = 154 and 6 + 4 = 10* *676 + 8 is 684 since 8 = 4 + 4 and 76 + 4 + 4 = 84* Add pairs of 'friendly' 3-digit numbers e.g. *320 + 450* Begin to add amounts of money using partitioning Column method-regrouping. Using place value counters (up to 3 digits)	Use of place value counters or dienes to add HTO + TO and HTO + HTO. (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 represent counters in a place value chart and circle when they make an exchange.  Bar model with missing totals.	Use expanded column addition to add two or three 3-digit numbers or three 2-digit numbers Vertical layout: (tens digit first) Partitioning **e.g.** 47 + 76 = 123 40 and 7 70 and 6 110 and 13 Adding the tens first enables the children to get a rough size of the answer. Compact column addition 243 +368 611 1 1

Y3-	Know pairs with each total to 20 e.g. *8 – 2 = 6* e.g. *18 – 6 = 12* e.g. *15 – 8 = 7* Subtract any two 2-digit numbers Perform place-value subtractions without a struggle e.g. *536 – 30 = 506* Subtract 2-digit numbers from numbers > 100 by counting up e.g. *143 – 76 is done by starting at 76. Then add 4 (80), then add 20 (100), then add 43, making the difference a total of 67* Subtract multiples and near multiples of 10 and 100 Subtract, when appropriate, by counting back or taking away, using place value and number facts Find change from £1, £5 and £10 Column method with regrouping. (up to 3 digits using place value counters)	Column method using place value counters or dienes. 	Represent place value counters pictorially, remembering to show what has been exchanged. 	Use expanded column subtraction for 3-digit numbers (decomposition) Use standard column subtraction for 3-digit numbers (decomposition) $\begin{array}{r} 2\overset{3}{\cancel{3}}\overset{1}{4} \\ -\ 88 \\ \hline 6 \end{array}$

Y3x	Know by heart all the multiplication facts in the ×2, ×3, ×4, ×5, ×8 and ×10 tables Multiply whole numbers by 10 and 100 Recognise that multiplication is commutative Use place value and number facts in mental multiplication e.g. *30 × 5 is 15 × 10* Partition teen numbers to multiply by a 1-digit number e.g. *3 × 14 as 3 × 10 and 3 × 4* Double numbers up to 100 Arrays 2d × 1d using base 10	Partition to multiply using Numicon, Cuisenaire rods or base 10.  Formal column method with place value counters or base 10. 3 x 23  Formal column method with place value counters. 6 x 23  	   	Children to be encouraged to show the steps they have taken.  Use partitioning (grid multiplication) to multiply 2-digit and 3-digit numbers by 'friendly' 1-digit numbers e.g. grid layout (expanded method): x | 30 | 8 5 | 150 | 40 150 + 40= 190 Expanded and formal written method 6 x 23 = 23 × 6 138 1 1

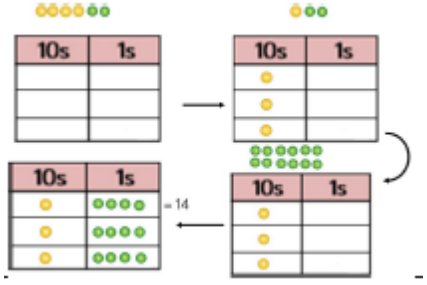
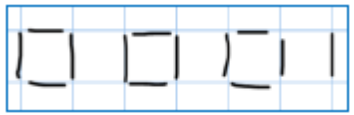
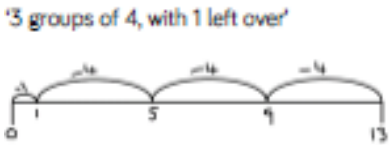
x	30	8
5	150	40

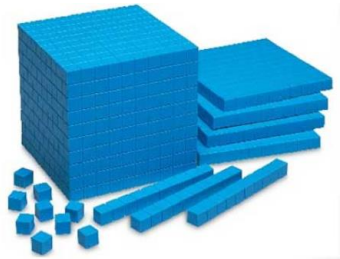
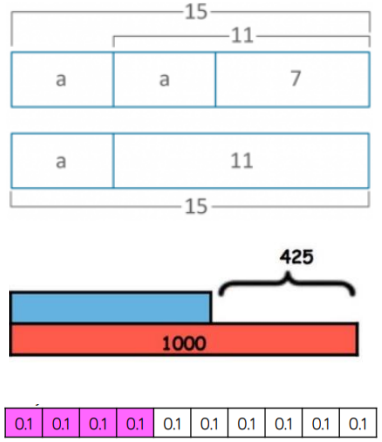
150 + 40= 190

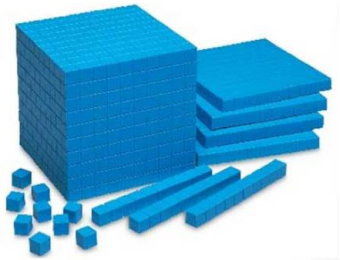
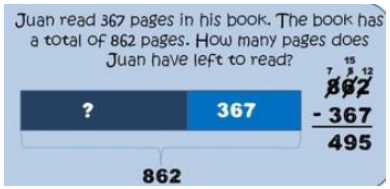
Expanded and formal written method

6 x 23 =

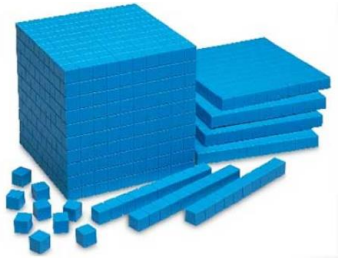
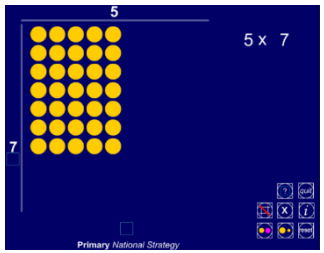
$$\begin{array}{r} 23 \\ \times\ 6 \\ \hline 138 \\ \hline 1\ 1 \end{array}$$

Y3÷	Know by heart all the division facts derived from the ×2, ×3, ×4, ×5, ×8 and ×10 tables Divide whole numbers by 10 or 100 to give whole number answers Recognise that division is not commutative Use place value and number facts in mental division e.g. *84 ÷ 4 is half of 42* Divide larger numbers mentally by subtracting the 10th multiple as appropriate, including those with remainders e.g. *57 ÷ 3 is 10 + 9 as 10 × 3 = 30 and 9 × 3 = 27* Halve even numbers to 100, halve odd numbers to 20 Division with a remainder-using lollipop sticks, times tables facts and repeated subtraction. 2d divided by 1d using base 10 or place value counters	2 digit ÷ 1 digit using lolly sticks or Cuisenaire rods above a ruler. Use of lollipop sticks to form wholes- squares are made because we are dividing by 4.  There are 3 whole squares, with 1 left over. Sharing using place value counters. Eg 42 ÷3= 	Children represent lolly sticks pictorially. 13÷3=  There are 3 whole squares with 1 left over.	Children encouraged to use times tables facts or show repeated addition on a number line.  43÷3 = 14r1 30+13 10+4r1 = 14r1 Children use sort division scaffold. 15r1 5 ⟌ 76

Y4+	Add any two 2-digit numbers by partitioning or counting on Know by heart/quickly derive number bonds to 100 and to £1 Add to the next 100, £1 and whole number e.g. *234 + 66 = 300* e.g. *3·4 + 0·6 = 4* Perform place-value additions without a struggle e.g. *300 + 8 + 50 + 4000 = 4358* Add multiples and near multiples of 10, 100 and 1000 Add £1, 10p, 1p to amounts of money Use place value and number facts to add 1-, 2-, 3- and 4-digit numbers where a mental calculation is appropriate e.g. *4004 + 156 by knowing that 6 + 4 = 10 and that 4004 + 150 = 4154 so the total is 4160* Column method - regrouping. (up to 4 digits)	Use of dienes to add ThHTO + HTO and ThHTO + ThHTO. (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. When there are 10 hundreds in the 100s column, we exchange for 1 thousand). 	Bar models including unknown numbers up to 4 digits and decimals up to 1 decimal place. 	Column addition for 3-digit and 4-digit numbers e.g. Compact written method: . 3557 1457 5014 11 Pupils need to be secure in understanding of place value so once they are working with 3+ digits and with decimals they can begin to use this compact method.

Y4-	Subtract any two 2-digit numbers Know by heart/quickly derive number bonds to 100 Perform place-value subtractions without a struggle e.g. *4736 – 706 = 4030* Subtract multiples and near multiples of 10, 100, 1000, £1 and 10p Subtract multiples of 0·1 Subtract by counting up e.g. *503 – 368 is done by adding 368 + 2 + 30 + 100 + 3 (so we added 135)* Subtract, when appropriate, by counting back or taking away, using place value and number facts Subtract £1, 10p, 1p from amounts of money Find change from £10, £20 and £50 Column method with regrouping. (up to 4 digits)	Use of dienes to subtract ThHTO - HTO and ThHTO - ThHTO. Exchange 1000 for 10 hundreds and so on. 	Use bar model to calculate subtraction with larger numbers. 	Use expanded column subtraction for 4-digit numbers (decomposition) Use standard column subtraction for 4-digit numbers (decomposition) **1** 6 ~~7~~ 4 -2 7 4 7

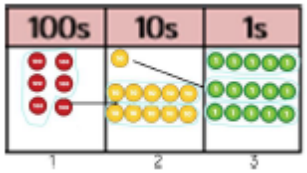
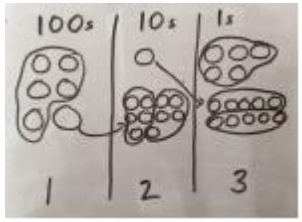
<table>
<tr>
<td>Y4x</td>
<td>Know by heart all the multiplication facts up to
12 × 12
Recognise factors up to 12 of 2-digit numbers
Multiply whole numbers and 1-place decimals by 10, 100, 1000
Multiply multiples of 10, 100 and 1000 by 1-digit numbers
e.g. 300 × 6
e.g. 4000 × 8
Use understanding of place value and number facts in mental multiplication
e.g. 36 × 5 is half of 36 × 10
e.g. 50 × 60 = 3000
Partition 2-digit numbers to multiply by a 1-digit number mentally
e.g. 4 × 24 as 4 × 20 and 4 × 4
Multiply near multiples by rounding
e.g. 33 × 19 as (33 × 20) – 33
Find doubles to double 100 and beyond using partitioning
Begin to double amounts of money
e.g. £35·60 doubled is £71·20

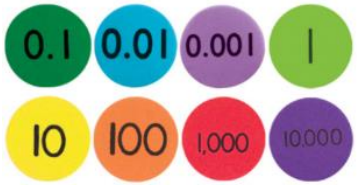
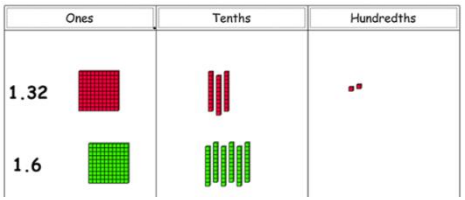
Column multiplication introduced with place value counters.
(2 and 3 digit multiplied by 1 digit)</td>
<td>Use of dienes to multiply.
 
ITP arrays extend knowledge from Y3.
 
</td>
<td></td>
<td>Use a vertical written method to multiply a 1-digit number by a 3-digit number (ladder method) expanded written method

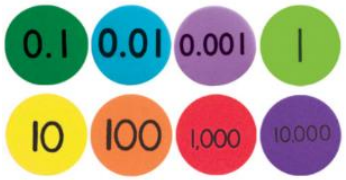
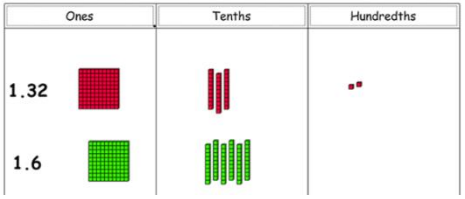
136
X5
30
150
500
680

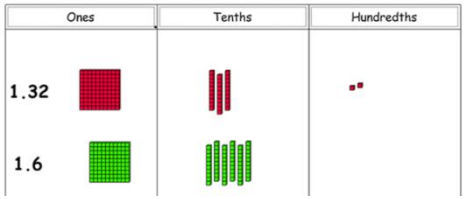
Use an efficient written method to multiply a 2-digit number by a number between 10 and 20 by partitioning (grid method)

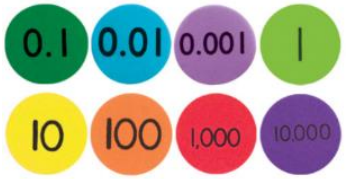
<table>
<tr><td>x</td><td>30</td><td>5</td></tr>
<tr><td>10</td><td>300</td><td>50</td></tr>
<tr><td>4</td><td>120</td><td>20</td></tr>
<tr><td colspan="3">300+50+120+20+ 490</td></tr>
</table></td>
</tr>
</table>

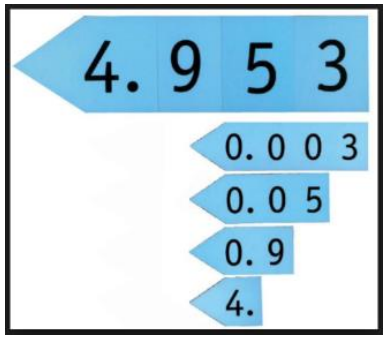
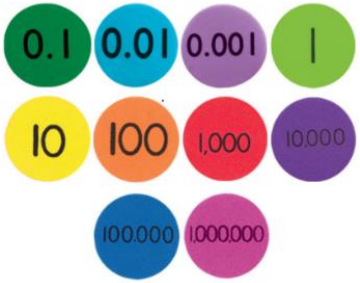
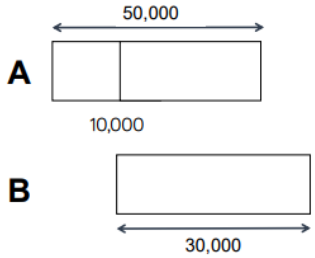
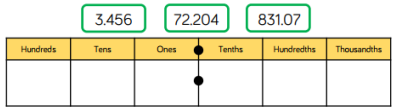
Y4÷	Know by heart all the division facts up to 144 ÷ 12 Divide whole numbers by 10, 100, to give whole number answers or answers with 1 decimal place Divide multiples of 100 by 1-digit numbers using division facts e.g. *3200 ÷ 8 = 400* Use place value and number facts in mental division e.g. *245 ÷ 20 is half of 245 ÷ 10* Divide larger numbers mentally by subtracting the 10th or 20th multiple as appropriate e.g. *156 ÷ 6 is 20 + 6 as 20 × 6 = 120 and* *6 × 6 = 36* Find halves of even numbers to 200 and beyond using partitioning Begin to halve amounts of money e.g. *half of £52·40 is £26·20* Division with a remainder Short division (up to 3 digits by 1 digit concrete and pictorial)	Short division using place value counters to group. 615 ÷ 5 = 	Represent the place value counters pictorially. 	Use a written method to divide a 2-digit or a 3-digit number by a 1-digit number. Give remainders as whole numbers. **477 ÷ 7** **477** **- 420 (60 lots of 7)** **57** **- 56 (8 lots of 7)** **1** Children are encouraged to write the times table for support. **x 7** 1 x 7 = 7 2 x 7 = 14 3 x 7 = 21 4 x 7 = 28 5 x 7 = 35 Children use short division scaffold. $5\overline{)615}$ = 123

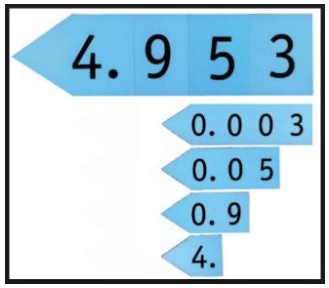
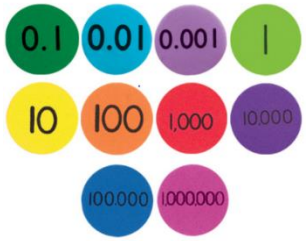
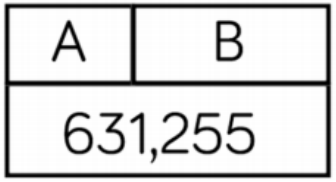
Y5+	Know number bonds to 1 and to the next whole number Add to the next 10 from a decimal number e.g. *13·6 + 6·4 = 20* Add numbers with 2 significant digits only, using mental strategies e.g. *3·4 + 4·8* e.g. *23 000 + 47 000* Add 1- or 2-digit multiples of 10, 100, 1000, 10 000 and 100 000 e.g. *8000 + 7000* e.g. *600 000 + 700 000* Add near multiples of 10, 100, 1000, 10 000 and 100 000 to other numbers e.g. *82 472 + 30 004* Add decimal numbers which are near multiples of 1 or 10, including money e.g. *6·34 + 1·99* e.g. *£34·59 + £19·95* Use place value and number facts to add two or more 'friendly' numbers, including money and decimals e.g. *3 + 8 + 6 + 4 + 7* e.g. *0·6 + 0·7 + 0·4* e.g. *2056 + 44* Use negative numbers on a scale Column method regrouping. Use of place value counters for adding decimals.	Children use arrow cards, dienes and place value counters for numbers up to 100,000 including 2 decimal places.   	Children use place value charts to calculate numbers up to 2 decimal places. 	Use column addition to add two or three whole numbers with up to 5 digits Use column addition to add any pair of 2-place decimal numbers, including amounts of money 34.10 + 2.65 36.75 Check answers using inverse calculation and bar model

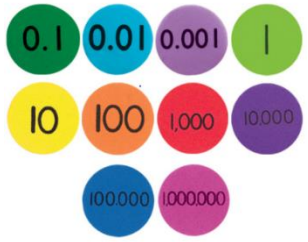
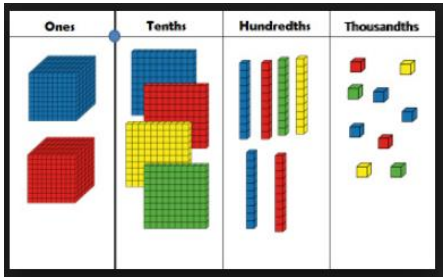
Y5-	Subtract numbers with 2 significant digits only, using mental strategies e.g. *6·2 – 4·5* e.g. *72 000 – 47 000* Subtract 1- or 2-digit multiples of 10, 100, 1000, 10 000 and 100 000 e.g. *8000 – 3000* e.g. *60 000 – 200 000* Subtract 1- or 2-digit near multiples of 10, 100, 1000, 10 000 and 100 000 from other numbers e.g. *82 472 – 30 004* Subtract decimal numbers which are near multiples of 1 or 10, including money e.g. *6·34 – 1·99* e.g. *£34·59 – £19·95* Use counting up subtraction, with knowledge of number bonds to 10, 100 or £1, as a strategy to perform mental subtraction e.g. *£10 – £3·45* e.g. *1000 – 782* Column method with regrouping. Abstract for whole numbers. Start with place value counters for decimals- with the same amount of decimal places.	Children use arrow cards, dienes and place value counters for numbers up to 100,000 including 2 decimal places.   	Children use place value charts to calculate numbers up to 2 decimal places. 	Use compact or expanded column subtraction (decomposition) to subtract numbers with up to 7 digits In Y5 and 6, time will also be spent dealing with zeros when adjusting the columns as this can be confusing to many children. e.g. 402 – 187 1 ~~4~~ ~~0~~ 2 -1 8 7 2 1 5 Choose the most efficient method in any given situation

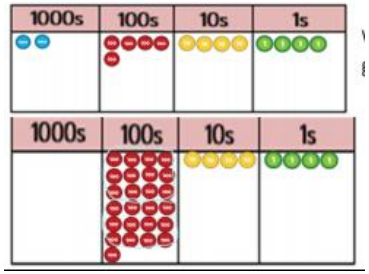
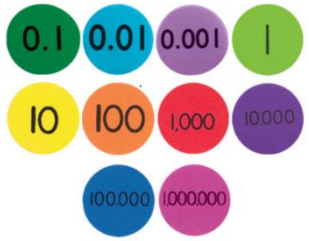
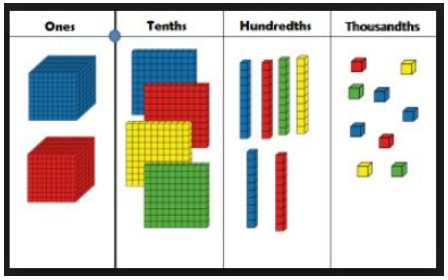
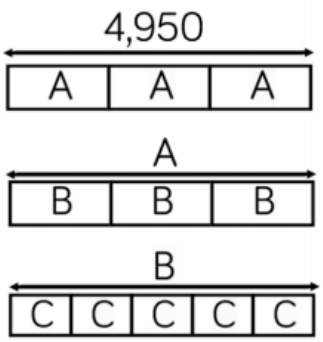
Y5x	Know by heart all the multiplication facts up to 12 × 12 Multiply whole numbers and 1- and 2-place decimals by 10, 100, 1000, 10 000 Use knowledge of factors and multiples in multiplication e.g. *43 × 6 is double 43 × 3* e.g. *28 × 50 is $^1/_2$ of 28 × 100 = 1400* Use knowledge of place value and rounding in mental multiplication e.g. *67 × 199 as 67 × 200 – 67* Use doubling and halving as a strategy in mental multiplication e.g. *58 × 5 is half of 58 × 10* e.g. *34 × 4 is 34 doubled twice* Partition 2-digit numbers, including decimals, to multiply by a 1-digit number mentally e.g. *6 × 27 as 6 × 20 (120) plus 6 × 7 (42)* Double amounts of money by partitioning e.g. *£37·45 doubled is £37 doubled (£74) plus 45p doubled (90p) giving a total of £74·90* Column multiplication Abstract only but might need a repeat of year 4 first (up to 4 digit numbers multiplied by 1 or 2 digits)	Children use dienes and place value counters for numbers up to 100,000 including 2 decimal places.  	Children use place value charts to calculate numbers up to 2 decimal places. 	Use short multiplication to multiply a 1-digit number by a number with up to 4 digits. Use long multiplication to multiply 2-digit and 4-digit numbers by a number between 11 and 20. Choose the most efficient method in any given situation. Most children in Y5 should be able to work with the grid method and the expanded written (ladder) method. More able children may begin to use the standard written method. 142 × 9 = 1278 142 × 19 = 1278 + 1420 = 2698 Find simple percentages of amounts. e.g. *10%, 5%, 20%, 15% and 50%*

Y5÷	Know by heart all the division facts up to 144 ÷ 12 Divide whole numbers by 10, 100, 1000, 10 000 to give whole number answers or answers with 1, 2 or 3 decimal places Use doubling and halving as mental division strategies e.g. *34 ÷ 5 is (34 ÷ 10) × 2* Use knowledge of multiples and factors, as well as tests for divisibility, in mental division e.g. *246 ÷ 6 is 123 ÷ 3* e.g. *We know that 525 divides by 25 and* *by 3* Halve amounts of money by partitioning e.g. *½ of £75·40 = ½ of £75 (£37·50) plus half of 40p (20p) which is £37·70* Divide larger numbers mentally by subtracting the 10th or 100th multiple as appropriate e.g. *96 ÷ 6 is 10 + 6, as 10 × 6 = 60 and 6 × 6 = 36* e.g. *312 ÷ 3 is 100 + 4 as 100 × 3 = 300 and* *4 × 3 = 12* Know tests for divisibility by 2, 3, 4, 5, 6, 9 and 25 Know square numbers and cube numbers Reduce fractions to their simplest form Short division (up to 4 digits by a 1 digit number including remainders)		Children use place value charts to calculate numbers up to 2 decimal places. 	Use short division to divide a number with up to 4 digits by a number ≤ 12 Give remainders as whole numbers or as fractions. Find non-unit fractions of large amounts. Turn improper fractions into mixed numbers and vice versa. Choose the most efficient method in any given situation. Explain the bus stop method through chunking. 106r2 6)638 600 100x 38 36 6x 2 Then 106r2 6)638

Y6 +	Know by heart number bonds to 100 and use these to derive related facts e.g. *3·46 + 0·54* Derive, quickly and without difficulty, number bonds to 1000 Add small and large whole numbers where the use of place value or number facts makes the calculation do-able mentally e.g. *34 000 + 8000* Add multiples of powers of 10 and near multiples of the same e.g. *6345 + 199* Add negative numbers in a context such as temperature where the numbers make sense Add two 1-place decimal numbers or two 2-place decimal numbers less than 1 e.g. *4·5 + 6·3* e.g. *0·74 + 0·33* Add positive numbers to negative numbers e.g. *Calculate a rise in temperature or continue a sequence beginning with a negative number* Column method regrouping. Abstract methods. Place value counters to be used for adding decimal numbers.	Children use arrow cards or place value counters up to 10,000,000 including 3 decimal places.  	Children use bar models using knowledge of number bonds.  Children use place value charts to calculate numbers up to 3 decimal places. 	Use column addition to add numbers with up to 8 digits. Use column addition to add decimal numbers with up to 3 decimal places. Add mixed numbers and fractions with different denominators.

Y6 -	Use number bonds to 100 to perform mental subtraction of any pair of integers by complementary addition e.g. *1000 – 654 as 46 + 300 in our heads* Use number bonds to 1 and 10 to perform mental subtraction of any pair of 1-place or 2-place decimal numbers using complementary addition and including money e.g. *10 – 3·65 as 0·35 + 6* e.g. *£50 – £34·29 as 71p + £15* Use number facts and place value to perform mental subtraction of large numbers or decimal numbers with up to 2 places e.g. *467 900 – 3005* e.g. *4·63 – 1·02* Subtract multiples of powers of 10 and near multiples of the same Subtract negative numbers in a context such as temperature where the numbers make sense Column method with regrouping. Abstract methods. Place value counters for decimals with different amounts of decimal places.	Children use arrow cards or place value counters up to 10,000,000 including 3 decimal places.  	Bar model for addition and subtraction. 	Use column subtraction (decomposition) to subtract numbers with up to 8 digits. Subtract mixed numbers and fractions with different denominators.

Y6 x	Know by heart all the multiplication facts up to 12 × 12 Multiply whole numbers and decimals with up to 3 places by 10, 100 or 1000 e.g. *234 × 1000 = 234 000* e.g. *0·23 × 1000 = 230* Identify common factors, common multiples and prime numbers and use factors in mental multiplication e.g. *326 × 6 is 652 × 3 which is 1956* Use place value and number facts in mental multiplication e.g. *4000 × 6 = 24 000* e.g. *0·03 × 6 = 0·18* Use doubling and halving as mental multiplication strategies, including to multiply by 2, 4, 8, 5, 20, 50 and 25 e.g. *28 × 25 is a quarter of 28 × 100 = 700* Use rounding in mental multiplication e.g. *34 × 19 as (34 × 20) – 34* Multiply 1- and 2-place decimals by numbers up to and including 10 using place value and partitioning e.g. *3·6 × 4 is 12 + 2·4* e.g. *2·53 × 3 is 6 + 1·5 + 0·09* Double decimal numbers with up to 2 places using partitioning e.g. *36·73 doubled is double 36 (72) plus double 0·73 (1·46)* Column multiplication Abstract methods (multi-digit up to 4 digits by a 2 digit number)	Long multiplication up to 8 digits using place value counters.  		Use standard long multiplication to multiply a 2-digit number by a number with up to 4 digits Use standard long multiplication to multiply a 3-digit number by a number with up to 4 digits Multiply fractions and mixed numbers by whole numbers Multiply fractions by proper fractions Use percentages for comparison and calculate simple percentages

Y6 ÷	Know by heart all the division facts up to 144 ÷ 12 Divide whole numbers by powers of 10 to give whole number answers or answers with up to 3 decimal places Identify common factors, common multiples and primes numbers and use factors in mental division e.g. *438 ÷ 6 is 219 ÷ 3 which is 73* Use tests for divisibility to aid mental calculation Use doubling and halving as mental division strategies, for example to divide by 2, 4, 8, 5, 20 and 25 e.g. *628 ÷ 8 is halved three times: 314, 157, 78·5* Divide 1- and 2-place decimals by numbers up to and including 10 using place value e.g. *2·4 ÷ 6 = 0·4* e.g. *0·65 ÷ 5 = 0·13* e.g. *£6·33 ÷ 3 = £2·11* Halve decimal numbers with up to 2 places using partitioning e.g. *Half of 36·86 is half of 36 (18) plus half of 0·86 (0·43)* Know and use equivalence between simple fractions, decimals and percentages, including in different contexts Recognise a given ratio and reduce a given ratio to its lowest terms Short division Long division with place value counters (up to 4 digits by a 2 digit number) Children should exchange into the tenths and hundredths column too	Long division using place value counters.   	Bar models to solve multiplication and division problems. 	Use short division to divide a number with up to 4 digits by a 2-digit number Use long division (standard long division method aka “bus stop”) to divide 3-digit and 4-digit numbers by ‘friendly’ 2-digit numbers. After exchanging the hundred, we have 14 tens. We can group 12 tens into a group of 12, which leaves 2 tens. 0 2 1 12 | 2544 24 14 12 2 After exchanging the 2 tens, we have 24 ones. We can group 24 ones into 2 group of 12, which leaves no remainder. 0 2 1 2 12 | 2544 24 14 12 24 24 0 Give remainders as whole numbers or as fractions or as decimals Divide a 1-place or a 2-place decimal number by a number ≤ 12 using multiples of the divisors. Divide proper fractions by whole numbers Chunking to include decimals: **e.g. 476 ÷5** **476** **- 450** **(90 lots of 5)** **26** **- 25** **(5 lots of 5)** **1** **- 1** **(0.2 lots of 5)** **0** **= 95.2**

				Extending to 3 or 4 digit by 2 digit division using chunking . 21 6/23 23)489 460 20x 29 23 1x 6