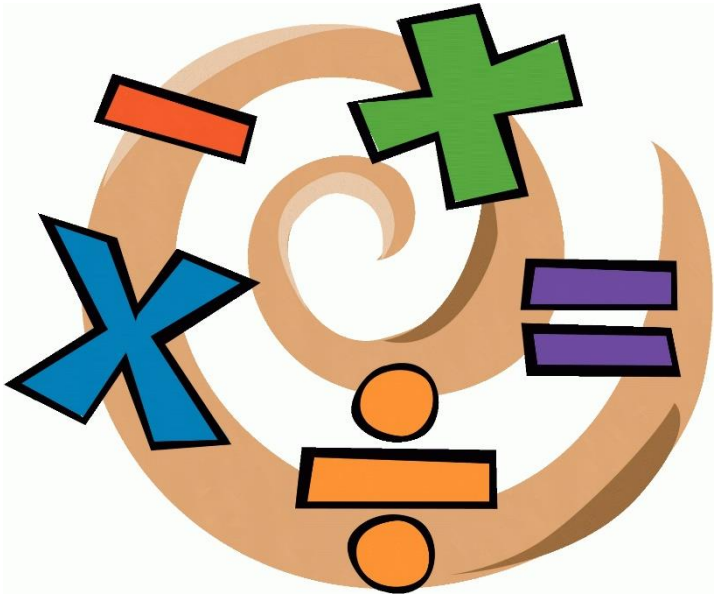
Written Calculation Methods
Middleton Primary School

ADDITION

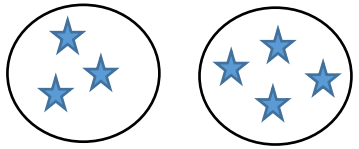
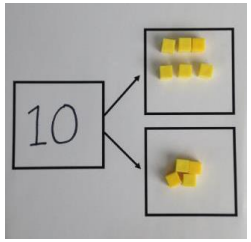
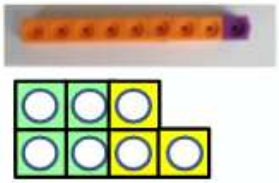
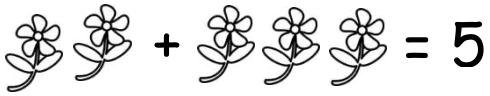
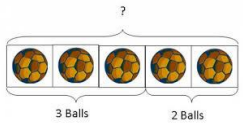
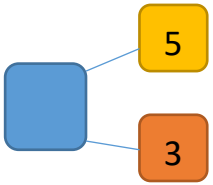
SUBTRACTION

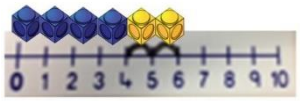
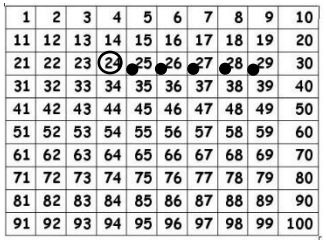
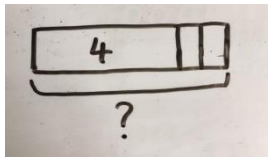
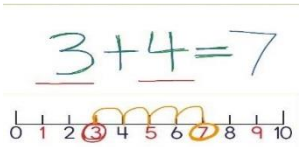


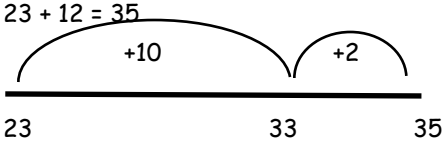
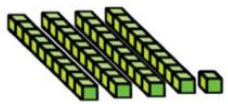
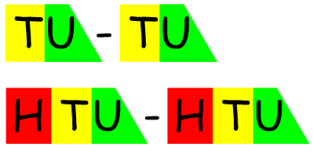
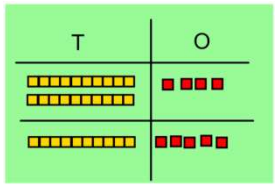
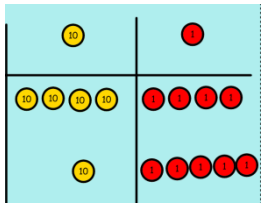
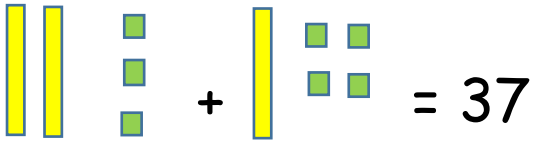
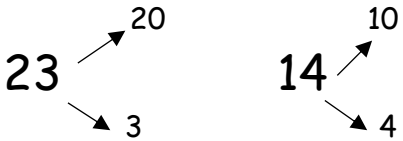
MULTIPLICATION

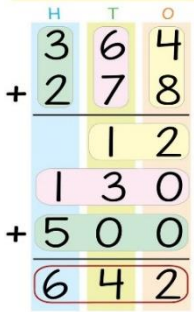
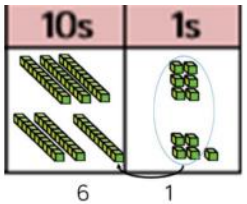
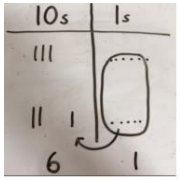
DIVISION

Written Methods Policy - Middleton Primary School – ADDITION

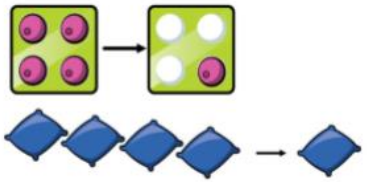
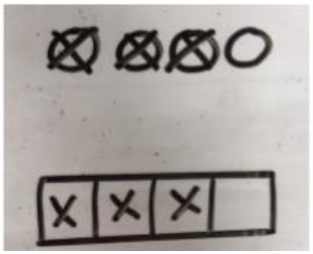
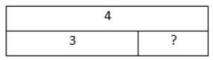
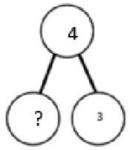
Step 1	Use songs and rhymes that include counting on, such as "1, 2, 3, 4, 5, Once I Caught a Fish Alive". Add by using jottings to draw objects then find out how many there are altogether. Add by mentally retaining a number and using fingers to count on. Add numbers together by counting on using a number line. Concrete 3 + 4 = 7    Pictorial   Abstract  5 + 3 = 8 3 + 5 = 8 Ben has 3 apples and Tom as 5. How many apples altogether?

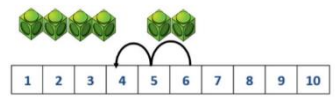
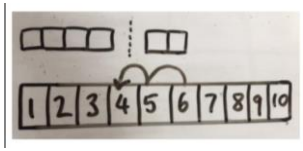
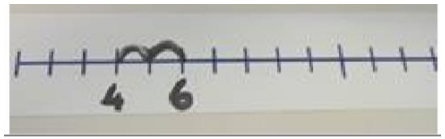
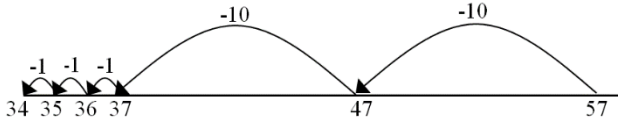
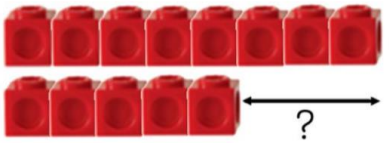
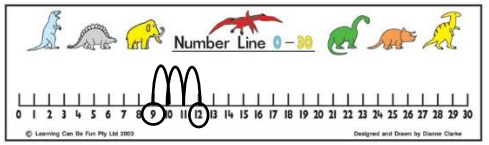
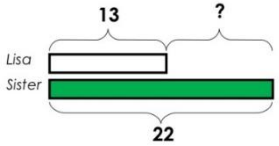
Step 2	Add numbers together by counting on Add 10 to a number by moving down one square. Concrete   Pictorial 24 + 5 =   Abstract What is 4 more than 7?  Children place larger number in their head and count on mentally, using their fingers or using jottings. 7 + 4 = 11 IIIIIII + IIII = 11

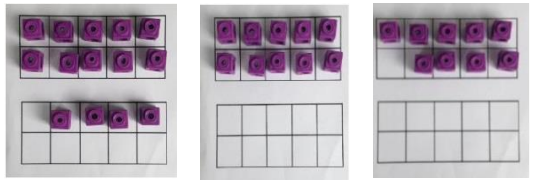
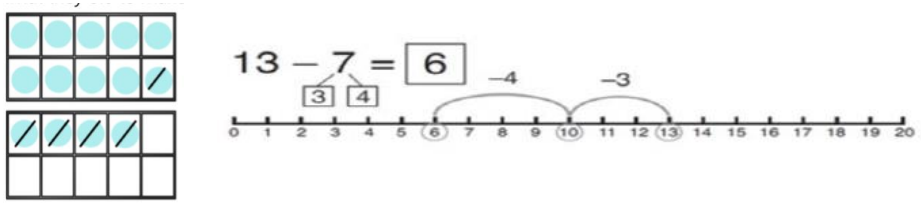
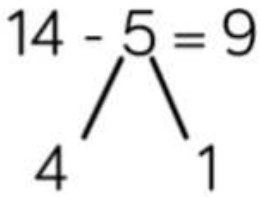
Step 3	Add numbers together by counting on using a blank number line, initially jumping in 1's but extending to jumping in 10's and 1's. 23 + 12 = 35 
Step 4 (NO REGROUPING)	Partition into hundreds, tens and ones and recombine. Concrete 41 + 8 = 49      Pictorial Use drawings to support partitioning and understanding of place value.  

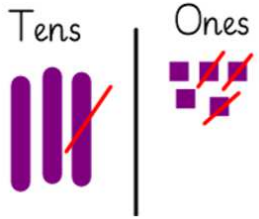
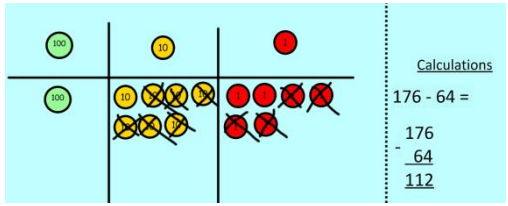
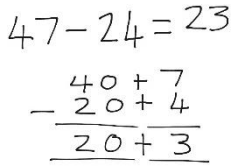
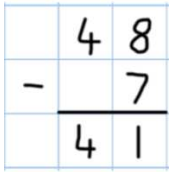
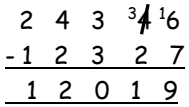
	Abstract Use expanded column addition to add 3-digit numbers. 
Step 5 Regrouping	Concrete/pictorial Using Base 10 or place value counters, make both numbers on the place value grid. Add up the ones and exchange 10 ones for 1 ten. Carry it over to the tens column.   Use shorter column method 1499 +1123 2622 1 1
Step 6	Use column addition to add whole numbers and decimals. 1628.9 + 117.25 1746.15 1 1

Written Methods Policy - Middleton Primary School – SUBTRACTION

Step 1	Use songs and rhymes that include counting back, such as Five Little Speckled Frogs, Five Little Men in a Flying Saucer and Ten Sizzling Sausages. Subtract by mentally retaining a number and using fingers to count back. Concrete  Pictorial   Abstract 4- 3 = □ = 4 – 3  

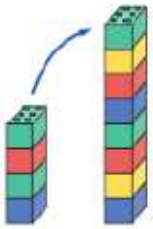
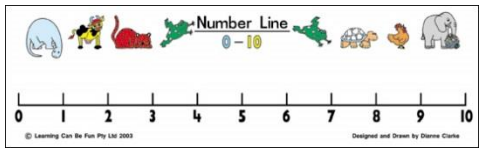
Step 2	Counting back Concrete 6 – 2 = 4   Pictorial  Abstract  This can progress up to counting back 2 digit numbers.  	Counting on Concrete  Pictorial 12 – 9 =  Abstract – bar model *Lisa is 13 years old. Her sister is 22 years old.* *Find the difference in age between them.* 

Step 3	Use of mental subtraction – getting to the nearest 10 concrete 14 – 5 =  Make 14 on the ten frame. 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. pictorial  abstract  14 – 4 = 10 10 – 1 = 9

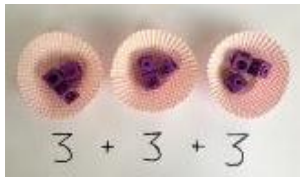
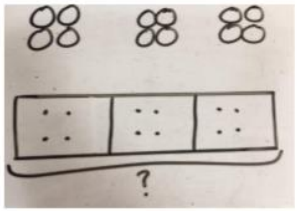
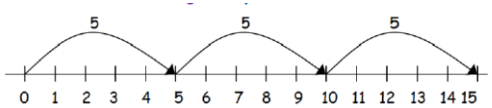
Step 4 (NO REGROUPING)	Pictorial 35 – 13 = 22 Reinforce place value so the children understand that it is 30 – 10 and not 3 – 1.   Abstract If needed, partition the number to reinforce 40 – 20 instead of 4 – 2.  Simple written column method. 
Step 5	Subtract using methods including borrowing 24346 – 12327 = 12019 

Step 6	Apply to decimals 1628.90 – 117.25 = 1511.65 $\begin{array}{r} 1\ 6\ 2\ 8\ .\ {}^{8}\not{9}\ {}^{1}0 \\ -\ 1\ 1\ 7\ .\ 2\ 5 \\ \hline 1\ 5\ 1\ 1\ .\ 6\ 5 \end{array}$

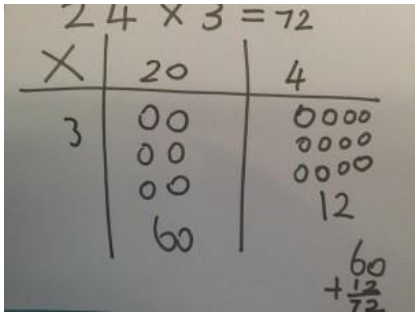
Written Methods Policy - Middleton Primary School – MULTIPLICATION

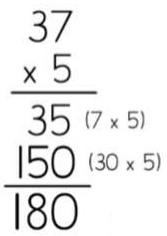
Step 1	Double numbers using objects in role play and practical contexts. concrete  double 4 is 8 4 × 2 = 8 pictorial Use jottings/number line to find the double of numbers. 4 + 4 = ... 

Step 2	Multiplication of 2s 5s and 10s Concrete  pictorial Calculate answers by drawing pictures. E.g. finding how many eyes on 3 people  Abstract Use of number line or timestable knowledge +2 +2 +2 +2  0 2 4 6 8

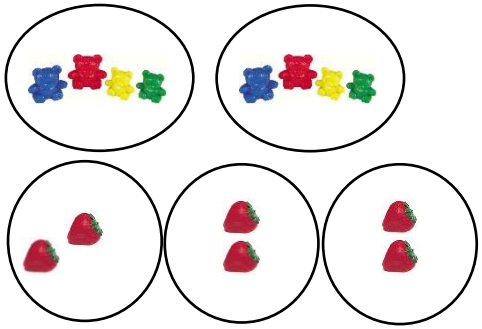
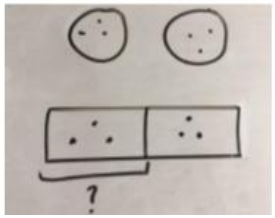
Step 3	Repeated addition Concrete  Pictorial   5 + 5 + 5 = 15 abstract From this, using their times table recall.

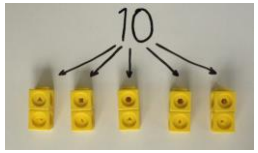
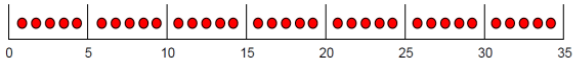
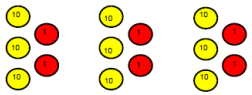
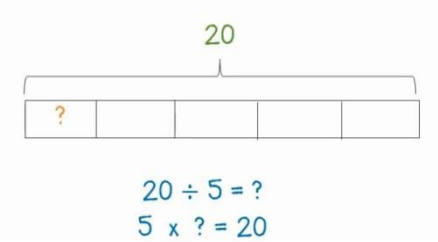
Step 4	Arrays concrete  pictorial  $4 \times 2 = 8$ $2 \times 4 = 8$  $2 \times 4 = 8$ $4 \times 2 = 8$

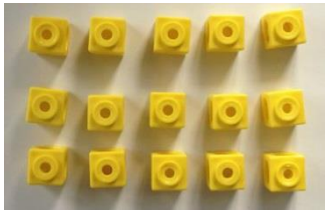
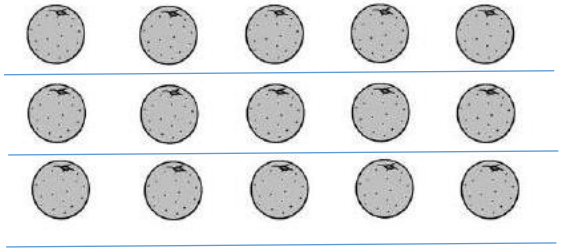
Step 5	Grid method Pictorial They can draw the counters, using colours to show different amounts or just use circles in the different columns to show their thinking as shown below  Abstract | × | 30 | 5 | | --- | --- | --- | | 7 | 210 | 35 | **210 + 35 = 245** | X | 1000 | 300 | 40 | 2 | | --- | --- | --- | --- | --- | | 10 | 10000 | 3000 | 400 | 20 | | 8 | 8000 | 2400 | 320 | 16 | Add up each row and then add them together.

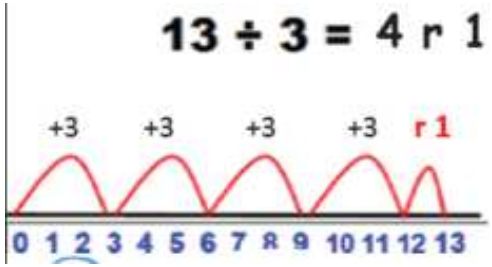
Step 6	Column method: Step back – partition if needed  Multiply numbers using the column method. 1 6 3 2 x 7 1 1 4 2 4 4 2 1 1 6 3 2 x 8 7 1 1 4 2 4 4 2 1 1 3 0 5 6 0 5 2 1 1 4 1 9 8 4 3 . 2 6 x 3 9 . 7 8 1

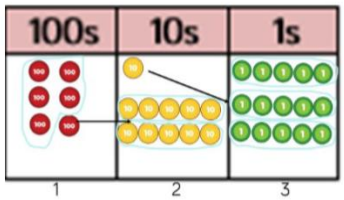
Written Methods Policy - Middleton Primary School – DIVISION

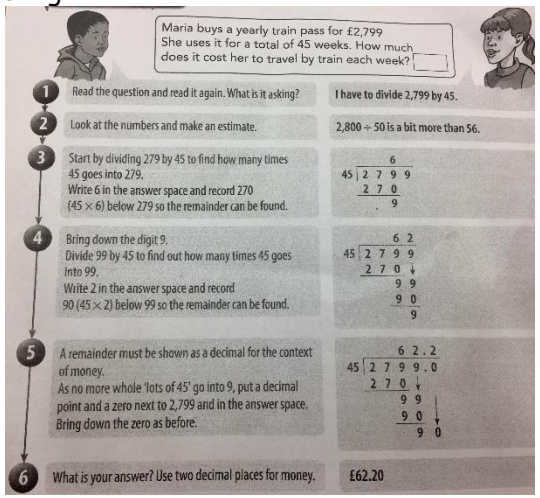
Step 1	Find half by sharing an even number over objects into two groups and then equal groups concrete  Pictorial  Abstract Using number sentences 4 ÷ 2 = 2

Step 2	Grouping numbers Concrete   96 ÷ 3 = 32  Pictorial  Abstract Using number sentences Using multiplication facts to support division

Step 3	Using arrays to support the ability to do inverse. Eg 15 ÷ 3 = 5 5 x 3 = 15 15 ÷ 5 = 3 3 x 5 = 15 Concrete  Pictorial Draw an array and use lines to split the array into groups to make multiplication and division sentences.  Abstract Writing the number sentences using their timestables knowledge

Step 4	Introduction of remainders Pictorial  Abstract writing the number sentence with the remainder

Step 5	Bus stop method – only using up to 12 Concrete/pictorial 615 ÷ 5  1. Make 615 with place value counters. 2. How many groups of 5 hundreds can you make with 6 hundred counters? 3. Exchange 1 hundred for 10 tens. 4. How many groups of 5 tens can you make with 11 ten counters? 5. Exchange 1 ten for 10 ones. 6. How many groups of 5 ones can you make with 15 ones? Abstract Begin with calculations with no remainders. $$\begin{array}{r} 2\ 1\ 8 \\ 4\overline{)\ 8\ 7\ 2} \\ \quad\ 3 \end{array}$$ Move onto calculations with remainders. $$\begin{array}{r} 8\ 6\ \text{r}\ 2 \\ 5\overline{)\ 4\ 3\ 2} \\ \quad\ 3 \end{array}$$

Step 6	Represent the remainder as a fraction Long division  Maria buys a yearly train pass for £2,799 She uses it for a total of 45 weeks. How much does it cost her to travel by train each week? ____ 1 Read the question and read it again. What is it asking? — I have to divide 2,799 by 45. 2 Look at the numbers and make an estimate. — 2,800 ÷ 50 is a bit more than 56. 3 Start by dividing 279 by 45 to find how many times 45 goes into 279. Write 6 in the answer space and record 270 (45 × 6) below 279 so the remainder can be found. — 6 / 45 | 2 7 9 9 / 2 7 0 / 9 4 Bring down the digit 9. Divide 99 by 45 to find out how many times 45 goes into 99. Write 2 in the answer space and record 90 (45 × 2) below 99 so the remainder can be found. — 6 2 / 45 | 2 7 9 9 / 2 7 0 ↓ / 9 9 / 9 0 / 9 5 A remainder must be shown as a decimal for the context of money. As no more whole 'lots of 45' go into 9, put a decimal point and a zero next to 2,799 and in the answer space. Bring down the zero as before. — 6 2 . 2 / 45 | 2 7 9 9 . 0 / 2 7 0 ↓ / 9 9 / 9 0 ↓ / 9 0 6 What is your answer? Use two decimal places for money. — £62.20 Decimals 1 4 . 6 16 21 3 5 | 5 1 1 . 0