Ringwood Junior School

Calculation Policy

KS1 Learning – Addition and subtraction

What pupils should already know from KS1:

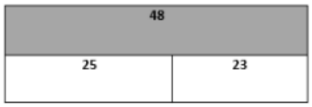
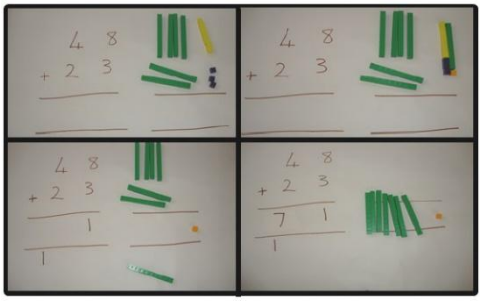
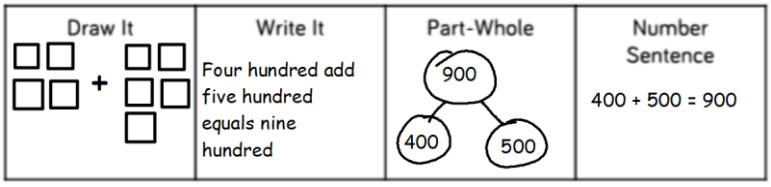
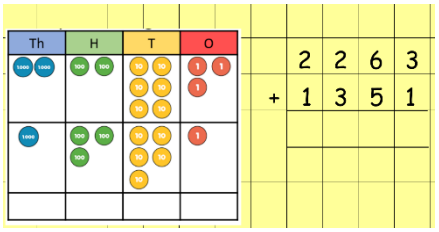
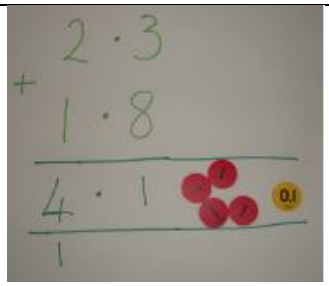
- Recognise symbols: + as addition; - as subtraction and = as equal to.
- Understand that addition is commutative and subtraction is not.
- Understand the inverse relationship of addition and subtraction and use this to check calculations and solve missing number problems.
- Know the language of 'sum' for addition and 'difference' for subtraction.
- Recall and use number bonds to 10 and 20 (1+9, 2+8, 3+7 etc and 1+19, 2+18, 3+17 etc). Use these to derive number bonds to 100.
- Be able to add and subtract two two-digit numbers (as well as two digits and one digit and two digits and a tens number).
- Be able to add three one-digit numbers.

KS1 Learning – Multiplication and division

What pupils should already know from KS1:

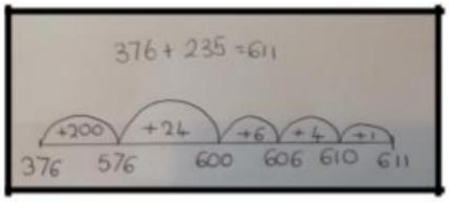
- Recognise symbols: x as multiplication; ÷ as division and = as equal to.
- Understand that multiplication as 'lots of' or 'groups of'. Understand division as sharing.
- Understand the inverse relationship of multiplication and division and use this to check calculations. Understand multiplication as repeated addition and division as repeated subtraction.
- Understand that multiplication can be done in any order (commutative) whilst division cannot.
- Recall and use multiplication and division facts for the 2, 5 and 10 times tables.
- Show arrays or sharing using concrete objects and pictures.
- Connect the 10 times table to place value; the 5 times table to divisions on a clock face and the 2 times table to doubling and halving.

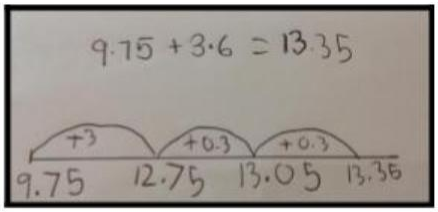
Addition

Revision of KS1 learning Moving to formal methods	 25 + 23 = 48 23 + 25 = 48 48 - 23 = 25 48 - 25 = 23 
Introduction to 3 digit + 3 digit	
Moving to formal methods starting with concrete and pictorial representations	 
Formal written column method (up to 8 digit numbers and decimals)	789 + 642 becomes 7 8 9 + 6 4 2 1 4 3 1 1 1 Answer: 1431 

Mental strategies for addition

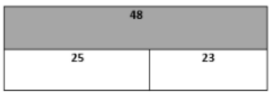
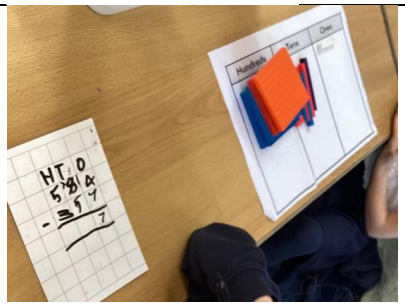
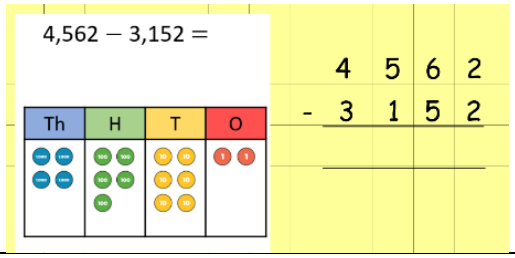
- Counting on efficiently (bridging through ten modelled on number lines)





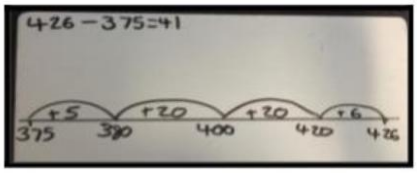
- Mental partitioning
- Recalling number bonds
- Scaling (ten times smaller)
- Using subtraction as the inverse
- Using estimating
- Using rounding

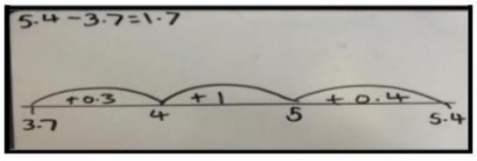
Subtraction

Revision of KS1 learning Subtraction as the inverse of addition	 25 + 23 = 48 23 + 25 = 48 48 - 23 = 25 48 - 25 = 23
Moving to formal methods starting with concrete and pictorial representations	 
Formal written column method (up to 8 digit numbers and decimals)	932 – 457 becomes 8 12 1 9 3 2 – 4 5 7 4 7 5

Mental strategies for subtraction

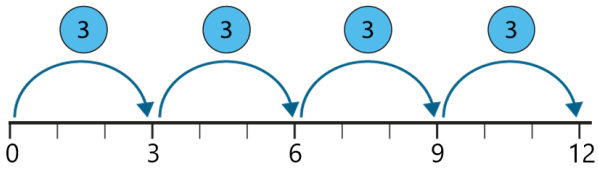
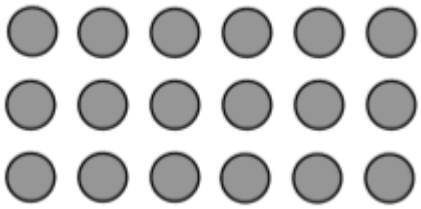
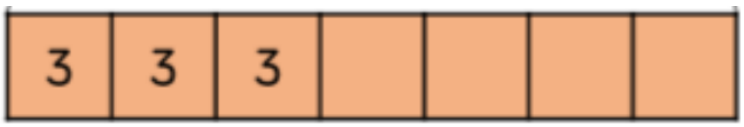
- Counting back efficiently (bridging through ten – modelled on number lines)

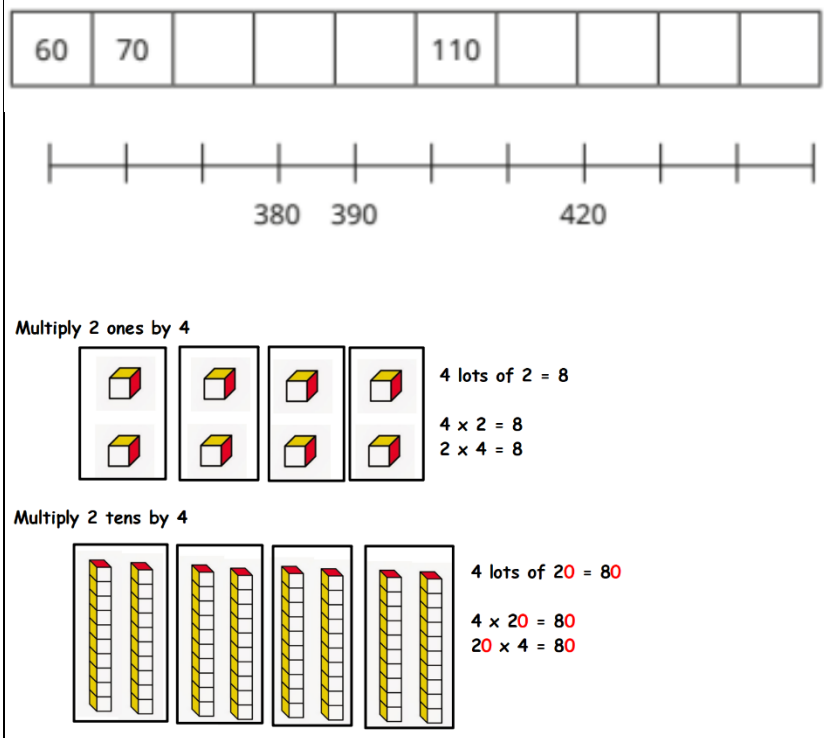
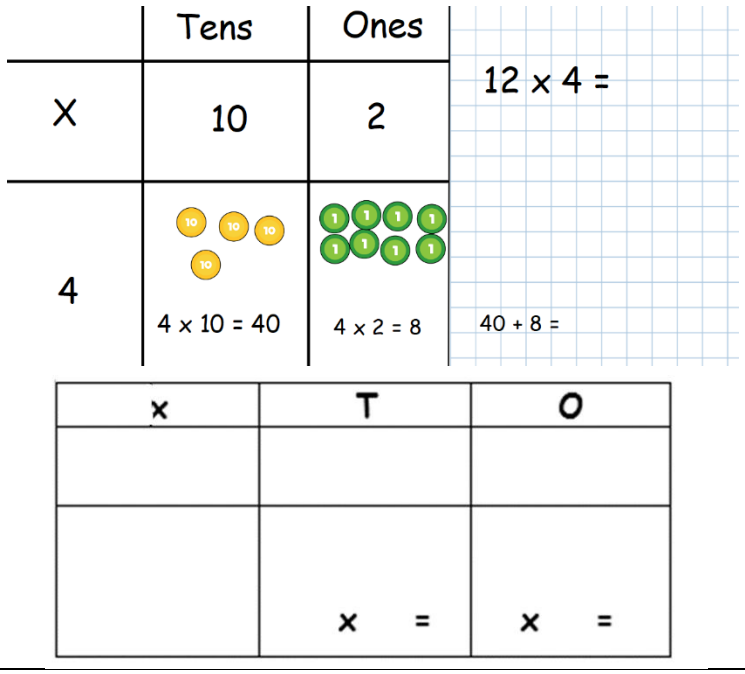
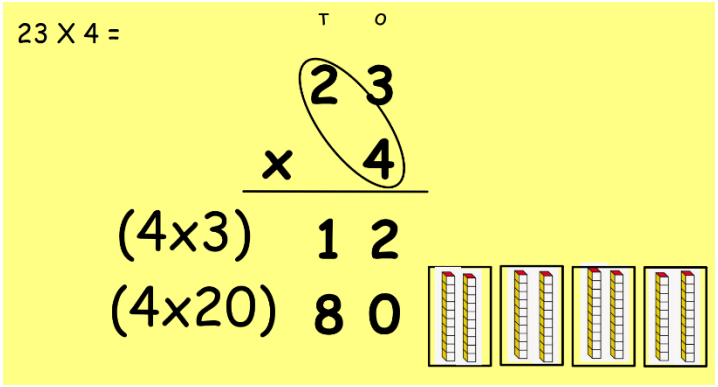




- Mental partitioning
- Recalling number bonds
- Scaling (ten times smaller)
- Using addition as the inverse
- Using estimating
- Using rounding

Multiplication

Times tables using concrete and pictorial representations (see times table progression document for order of teaching)	 3 x 3 = 3 lots of 3 3 groups of 3 Three 3s Numicon  There are 12 wheels. 4 × 3 = 12 3 × 4 = 12 Number lines ___ + ___ + ___ + ___ + ___ = ___ ___ × ___ = ___  Repeated addition  Arrays  Bar models  Use of a counting stick

Preparing for formal methods: Multiplying multiples of ten	
Multiplication using grid method	
Multiplication using formal column method (expanded)	

Formal method - short multiplication (including decimals)

		Th	H	T	O	
			2	3	4	
	×				6	
		1	4	0	4	
			2	2		

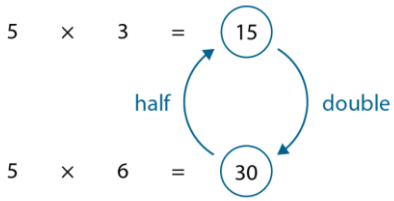
	2	1	· 3	
×			4	
	8	5	· 2	
		1		

```
  345
x 293
 1035
31050
69000
101085
```

Mental strategies for multiplication

- Counting forwards in equal steps (e.g in threes, fours etc)
- Doubling and near doubles
- Partitioning
- Using division as inverse of multiplication
- Using known facts to derive other facts (2, 10, 5, derive)

- Making links between times tables



Number	**0**	1	2	**3**	4	5	**6**	7	8	**9**	10	11	**12**	13	14	**15**	16	17	**18**	19	20	**21**	22	23	**24**
Counting in 3s	✓			✓			✓			✓			✓			✓			✓			✓			✓
Counting in 6s	✓						✓						✓						✓						✓

Number of bunches of balloons	× 10	× 1	Total number of balloons (× 11)
0	0	0	0
1	10	1	11
2	20	2	22
3	30	3	33
4	40	4	44
5	50	5	55
6	60	6	66
7	70	7	77
8	80	8	88
9	90	9	99
10	100	10	110
11	110	11	121
12	120	12	132

- Using place value to multiply by 10, 100, 1000 etc

Multiplying and Dividing by 10, 100 and 1000

10 000	1000	100	10	1	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$

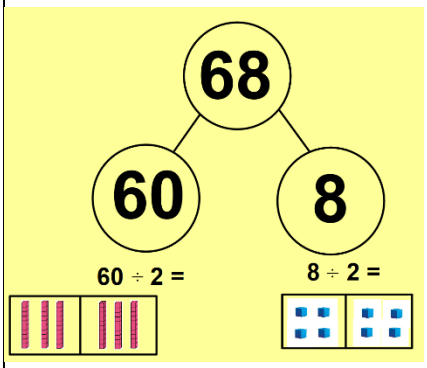
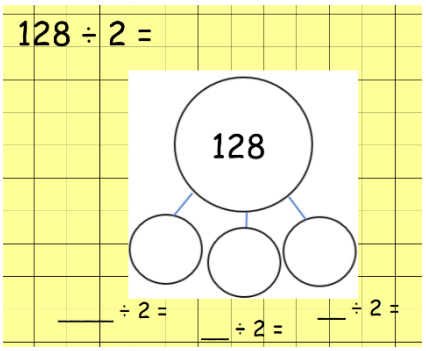
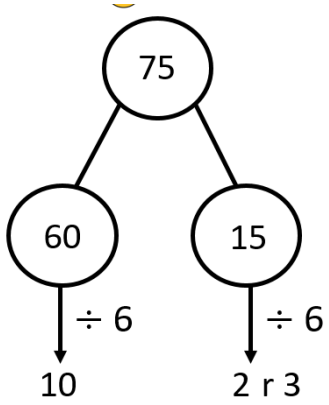
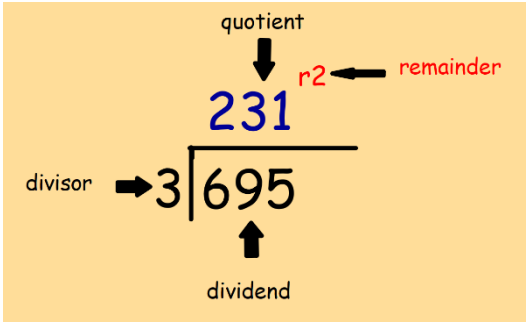
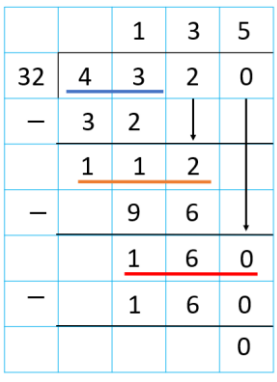
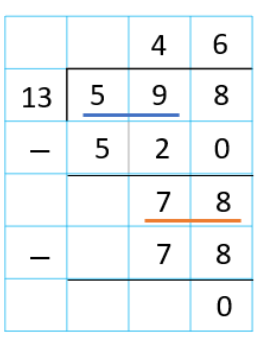
Multiplying

X 10 digits move LEFT **1** space
X 100 digits move LEFT **2** spaces
X 1000 digits move LEFT **3** spaces

Dividing

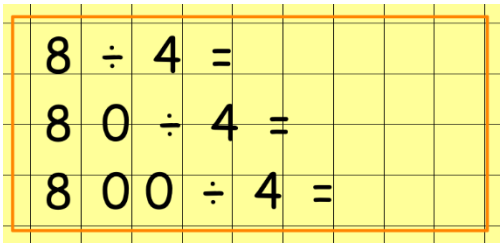
÷ 10 digits move RIGHT **1** space
÷ 100 digits move RIGHT **2** spaces
÷ 1000 digits move RIGHT **3** spaces

Division

Using known facts from multiplication times tables	5 x 4 = 20 and 4 x 5 = 20. 20 ÷ 5 = 4 and 20 ÷ 4 = 5
Partitioning to divide	   10 + 2 r 3 = 12 r 3
Formal written method for short division (including with decimals)	
Formal written method for long division and chunking	  13 × 4 = 52 13 × 5 = 65 13 × 6 = 78 13 × 7 = 91 (×40) (×6)

Mental strategies for division

- Counting forwards in equal steps (e.g in threes, fours etc)
- Halving
- Partitioning including scaling



- Using multiplication as the inverse of division
- Using place value to divide by 10, 100, 1000 etc