St. John the Baptist V.A. School

Written Calculation Policy
2015

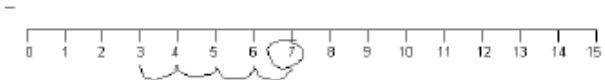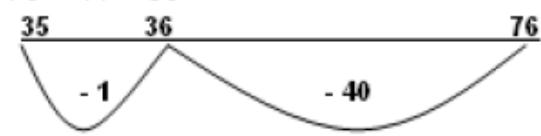# Addition: written calculations

Stage 1	Number line	Objectives
	$3+4=$	Add one-digit and two-digit numbers to 20, including zero

Stage 2	Blank number line used to count on in multiples of 10 and 1	
	$25 + 36 = 61$ Partitioning $47 + 52 = 99$ or $47 + 52 = 99$ $47 + 50 = 97$ $40 + 50 = 90$ $97 + 2 = 99$ $7 + 2 = 9$ $90 + 9 = 99$	Add numbers using concrete objects, pictorial representations, and mentally, including: - a two-digit number and ones TU + U - a two-digit number and tens TU + T - two two-digit numbers TU +TU - adding three one-digit numbers U + U + U -Higher ability children to move to HTU + TU

Stage 3	Column addition with carrying (see below ♣)	

	$442 + 335 = 777$ $872 + 541 = 1413$
	
	    4 4 2 8 7 2
	    3 3 5 + 5 4 1 +
	    7 7 7 1 4 1 3
	                              1 1
		Add numbers with up to three digits, using the formal written methods of columnar addition
		
		Estimate the answer to a calculation and use inverse operations to check answers

Stage 4	Column addition with carrying (see below ♣)	

	$442 + 335 = 777$ $7872 + 541 = 8413$
	
	    4 4 2 7 8 7 2
	    3 3 5 + 5 4 1 +
	    7 7 7 8 4 1 3
	                              1 1
		Add numbers with up to 4 digits using the formal written methods of columnar addition where appropriate
		
		Estimate and use inverse operations to check answers to a calculation

Stage 5	Column addition (including decimals with up to 2 decimal places)	

	$7176 + 6147 = 13323$ $4.28 + 7.99 = 12.27$
	
	    7 1 7 6 4 . 2 8
	    6 1 4 7 + 7 . 9 9 +
	    1 3 3 2 3 1 2 . 2 7
	        1 1 1 1 1
		Add whole numbers with more than 4 digits, including using formal written methods (columnar addition)
		
		Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
		Use addition methods in a range of real life and problem based contexts.

Stage 6	Column addition (including decimals with up to 3 decimal places)	

	$7176 + 6147 = 13323$ $4.28 + 7.99 = 12.27$
	
	    7 1 7 6 4 . 2 8
	    6 1 4 7 + 7 . 9 9 +
	    1 3 3 2 3 1 2 . 2 7
	        1 1 1 1 1
		As above
		
		Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy
		Use addition methods in a range of real life and problem based contexts.

♣ Use expanded methods if necessary to support move to formal method

$$47 \ = \ 40 + 7$$
$$+76 \qquad 70 + 6$$
$$\overline{\qquad 110 + 13} = 123$$

or

```
  47
+ 76
 ----
  13
 110
 ----
 123
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Subtraction: written calculations

Stage 1	Number line	Objectives
	Using a number Line: (with divisions): 0 1 2 3 4 5 6 (7) 8 9 10 11 12 13 14 15 $7 - 4 = 3$ Later use of blank number lines and later 100 squares.	Subtract one-digit and two-digit numbers to 20, including zero TU- U

Stage 2	Blank number line used to count back in multiples of 10 and 1	
	$76 - 41 = 35$ 35 36 76 -1 -40 Partitioning $76 - 41 = 35$ $76 - 40 = 36$ $36 - 1 = 35$	Subtract numbers using concrete objects, pictorial representations, and mentally, including: - a two-digit number and ones TU – U - a two-digit number and tens TU – T - two two-digit numbers TU – TU - Higher ability to move to HTU – TU

Stage 3	Column subtraction (see below ♣)	
	$242 - 131 = 111$ $74 - 27 = 47$ 242 -131 ‾‾‾ 111 $\overset{6\ 14}{7\!\!\!/4}$ – 2 7 ‾‾‾ 4 7	Subtract numbers **with up to three digits**, using the formal written methods of columnar subtraction Estimate the answer to a calculation and use inverse operations to check answers

Stage 4	(see below ♣)	
	$263 - 125 = 138$ $3675 - 1234 = 2441$ $\overset{5\ 1}{2\!\!\!/6\!\!\!/3}$ -125 ‾‾‾ 138 3675 - 1234 ‾‾‾‾ 2441	Subtract numbers **with up to 4 digits** using the formal written methods of columnar subtraction where appropriate Estimate and use inverse operations to check answers to a calculation

Stage 5	(including decimals with up to 2 decimal places)	
	$563 - 271 = 292$ $4.31 - 4.1 = 0.221$ $\overset{4\ 16}{5\!\!\!/6\!\!\!/3}$ – 2 7 1 ‾‾‾‾ 2 9 2 4.321 - 4.1 ‾‾‾ 0.221	Subtract whole numbers with **more than 4 digits**, including using formal written methods (columnar subtraction) Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy. Use subtraction methods in a range of real life and problem based contexts.

Stage 6	(including decimals with up to 3 decimal places)	
	$563 - 278 = 285$ $402.10 - 243.86 = 158.24$ $\overset{4\ 15\ 13}{5\!\!\!/6\!\!\!/3}$ – 2 7 8 ‾‾‾‾ 2 8 5 $\overset{3\ 9\ 11\ 10\ 10}{402.10}$ - 243.86 ‾‾‾‾ 158.24	**As above** Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy. Use addition methods in a range of real life and problem based contexts.

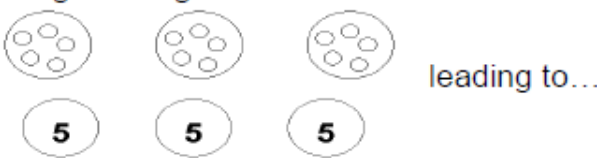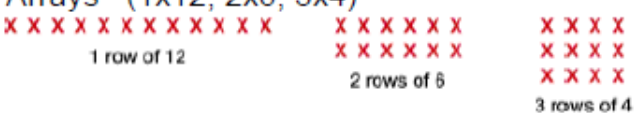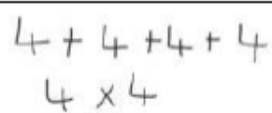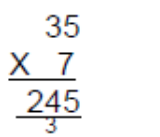♣ Use expanded methods if necessary to support move to formal method

$77 - 45 = 32$

70 + 7
- 40 + 5
30 + 2   = 32

and $74 - 27 = 47$

70 + 4	$\overset{60}{7\!\!\!/0} + \overset{14}{4}$
– 20 + 7	– 20 + 7
	40 + 7
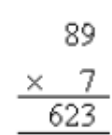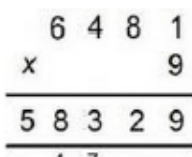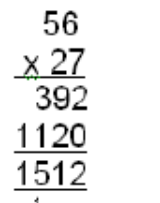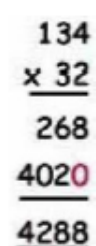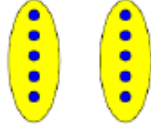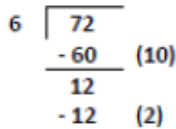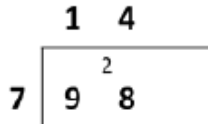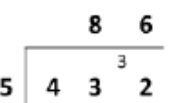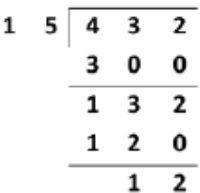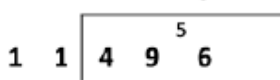
Multiplication: written calculations

Stage 1	Grouping	Objectives
	Making sets: eg 3 sets / lots of… leading to…	Solve simple one-step problems involving multiplication, calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher count in multiples of twos, fives and tens

Stage 2	Grouping / Arrays / Repeated addition	
	Arrays (1x12, 2x6, 3x4)	Calculate mathematical statements for multiplication within the multiplication tables and write them using the multiplication (×) and equals (=) signs
	Repeated addition (4x6) $4 + 4 + 4 + 4$ 4×4	TU x U or U x TU – know that it can be done in any order. Recall 2,5 and 10 times tables

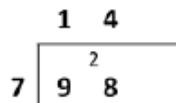| Stage 3	Grid method leading to short multiplication (see below ♣)	
	35 x 7 = 245 	×	30	5	 	7	210	35	 210 + 35 = 245 35 x 7 = 245 35 X 7 245 3	Write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, progressing to efficient written methods

Stage 4	Short Multiplication (see below ♣)	
	89 x 7 = 623 89 × 7 623 237 x 4 = 948 2 3 7 x 4 9 4 8 1 2	Multiply **two-digit and three-digit numbers** by a one-digit number using a formal written layout

Stage 5	Short and Long multiplication (Including decimals in context)	
	6481 x 9 = 58329 6 4 8 1 x 9 5 8 3 2 9 4 7 56 x 27 = 1512 56 x 27 392 1120 1512 1	Multiply numbers **up to 4 digits by a one- or two-digit number** using a formal written method, including long multiplication for two-digit numbers

Stage 6	Long multiplication (Including decimals in context)	
	134 x 32 = 4288 134 x 32 268 4020 4288 124 x 26 = 3224 1 2 1 2 4 x 2 6 7 4 4 2 4 8 0 3 2 2 4 1 1	Multiply **multi-digit numbers up to 4 digits by a two-digit whole number** using the formal written method of long multiplication

♣ use expanded methods if necessary to support move to formal method

30 + 8 X 7 56 210 266	8x7 = 56 30x7 = 210	or	38 X 7 56 210 266

Division: written calculations

Stage 1	Sharing… leading to…Grouping	Objectives

Share the apples between two people.	Solve simple one-step problems involving division, calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher
'Share 20 crayons between 2 pots.' 'How many crayons are in each pot?' Children should move from **sharing to grouping** in a practical way… 'Put 20 crayons into groups of 10. How many pots do we need?'	*Use arrays to support early division* How many groups of two?' 'Five groups of two' How many groups of 5?' 'Two groups of five'

Stage 2	Grouping

Use arrays to support division 15 ÷ 5 = 3 and 15 ÷ 3= 5 Use an empty number line to count forwards or back in equal steps	Calculate mathematical statements for division within the multiplication tables and write them using the division (÷) and equals (=) signs

Stage 3	Use of the Inverse Operation

Use of inverse operation to solve division sums. 26 ÷ 5 = 5 r1 5 x 5 = 25 25 + 1 = 26	Write and calculate mathematical statements for division using the multiplication tables that they know, progressing to efficient written methods

Stage 4	Chunking (including remainders) leading to short division

72 ÷ 6 = 12
 	
6 ⌐ 72
 - 60   (10)
  12
 - 12   (2)
	Leading to…
	
	   1 4
	      2
	7 ⌐ 9 8
		No specific objective for division written methods so…
		
		As above

Stage 5	Short division - dividing by a one digit number (Decimal division in context to be included)

98 ÷ 7 = 14
 	
   1   4
      2
7 ⌐ 9   8
	432 ÷ 5 = 86 r2
	
	   8 6 r2
	        3
	5 ⌐ 4 3 2
		Divide numbers **up to 4 digits by a one-digit number** using a formal written method of short division and interpret remainders appropriately for the context

Stage 6	Short and Long division - dividing by a two digit number (Decimal division in context to be included)

432 ÷ 15 r12
 	
   2   8   r12
1 5 ⌐ 4   3   2
      3   0   0
      1   3   2
      1   2   0
          1   2
 	
(see below ♣)
	496 ÷ 11 = 45 r1
	
	   4 5 r1
	         5
	1 1 ⌐ 4 9 6
	
	Answer: $45\frac{1}{11}$
		Divide numbers **up to 4 digits by a two-digit whole number** using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
		
		Divide numbers **up to 4 digits by a two-digit whole number** using the formal written method of short division, and interpret remainders according to the context

♣ A further method for long division that may be used:

```
                2   8 · 8
1   5 ⌐ 4   3   2 · 0
        3   0   ↓
        1   3   2
        1   2   0   ↓
            1   2   0
            1   2   0
                    0
```