## **St Andrew's CE Primary School**



## Whole School Written Calculation Policy Pencil and paper procedures Key Stages 1 and 2

Addition		
Year 1	Year 2	Year 3
Counting on using objects and numicon $\bigcirc$ Also using numicon $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$	<u>+ = signs and missing numbers</u> Continue using a range of equations as in Year 1 but with appropriate, larger numbers.	+ = signs and missing numbers Continue using a range of equations as in Year 1 and 2 but with appropriate, larger numbers balanced equations
<u>+ = signs and missing numbers</u> 3 + 4 = = 3 + 4	Extend to 14 + 5 = 10 + and adding three numbers 32 + + = 100 $35 = 1 + + 5$	Continue as in Year 2 but with appropriate numbers e.g. 35 + 19 is the same as 35 + 20 – 1 Pencil and paper procedures
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Refine to partitioning the second number only into tens and ones: ( Autumn Term )	(Autumn Term ) 36 + 53 =
Promoting covering up of operations and	23 + 12 = 23 + 10 +2	<u>+53</u> 9

numbers.	= 33 + 2 = 35	<u>80</u> <u>89</u>
Number lines	+10 +2	Pencil and paper procedures
(Teacher model number lines with missing numbers)	23 33 35	358 + 73 = 431 $358$ $+ 73$
7 + 4 = 11	Partition into tens and ones and recombine (Spring & Summer Term )	11 120 <u>300</u>
0 7 8 9 10 11	Partition both numbers and recombine 36 + 53 = 30 + 6 50 + 3 80 + 9 = 89	<u>431</u> <u>Pencil and paper procedures – compact method</u> (Summer Term) 36 <u>+53</u> <u>89</u>
Partition into tens and ones and recombine (Spring/Summer Term) 12 + 23 = 10 + 2 + 20 + 3 = 30 + 5 = 35	Teach all three partitioning methods but this is the preferred style to adopt. $24 + 17$ $20+ 10 = 30$ $4 + 7 = 11$ $41$ Preferred version $\frac{41}{41}$ Preferred versionMental Method – ongoing (Use a visual image)Add 9 or 11 by adding 10 and adjusting by 1	Add a near multiple of 10 to a two-digit number (Use a visual image) <u>Mental Method – ongoing</u> (Use a visual image) Add19/29 etc or 11/21 etc by adding 10/20 etc and adjusting by 1 35 + 9 = 44 35 + 19=54
	35 + 9 = 44	

Addition		
Year 4	Year 5	Year 6
+ = signs and missing numbers	+ = signs and missing numbers	+ = signs and missing numbers
Continue using a range of equations but with appropriate, larger numbers	Continue using a range of equations but with appropriate, larger numbers	Continue using a range of equations but with appropriate, larger numbers
balanced equations	0	balanced equations
$6 \times 5 = \Box + 15$	<u>balanced equations</u> $8 \times 6 = n + 23$	n X 6 = n + 23
Pencil and paper procedures		Pencil and paper procedures
Compact method, showing numbers carried		<u>( All Terms )</u>

underneath 358 + 73 - 431 - 11 Pencil and paper procedures (Summer Term.) Extend to numbers with at least four digits and decimals (money context) $3587 + 675 = 4262$ $3587 + \frac{675}{4262} - \frac{4262}{111}$	Pencil and paper procedures (All Terms) Extend to numbers with at least four digits 3587 + 675 = 4262 3587 + 675 4262 111 Extend to decimals (same number of decimals places) and adding several numbers (with different numbers of digits). 124.90 add in a zero to keep the place value + 117.25 242.15 11	Extend to numbers with at least four digits 63527 + 73984 $\frac{63527}{137511}$ <b>Extend to numbers with any number of digits and decimals with 1 and 2 decimal places.</b> 124.9 + 117.25 = 242.15 7124.90 add in a zero to keep the place value $+\frac{1117.25}{8242.15}$
	Subtraction	
Year 1	Year 2	Year 3

Year 1	Year 2	Year 3
Pictures / marks/objects/numicon	- = signs and missing numbers	- = signs and missing numbers
Sam spent 4p. What was his change from 10p?	Continue using a range of equations as in Year 1 but with	Continue using a range of equations as in Year 2 but with
a a a a a a a a a	appropriate numbers.	appropriate numbers.
	Extend to 14 + 5 = 20 -	Extend to 26 + 43 = 82 -
↓ ↓	Mental Method	Find a small difference by counting up
	Subtract 9 or 11. Begin to add/subtract 19 or 21 35 – 9 = 26 To be taught using a100 square	Continue as in Year 2 but with appropriate numbers e.g. 102 – 97 = 5
- = signs and missing numbers		Montal Mathod
7 - 3 = = 7 - 3	Use known number facts and place value to subtract	Mental Method

7 - = 4 4 = -3	(partition second number only) (Autumn & Spring	Subtract 9 or 11. Add/subtract 19 or 21
- 3 = 4 4 = 7 -	Term)	25  0 = 26
$-\nabla = 4$ $4 = -\nabla$		Use known number facts and place value to subtract
	37 - 12 = 37 - 10 - 2	Pencil and paper procedures
The difference between 7 and 11	= 27 - 2	(Autumn & Spring Terms)
(Counting back/taking away)	= 25	Unit digita da nat araga tana baundarias (without
'difference'	77	decomposition)
	25 27 37	
		98 197
		- <u>37</u> - <u>15</u>
/ 8 9 10 11	1 1 40	1 (8-7) 2
Recording by drawing jumps on propared lines	-1 -1 -10	<u>60</u> (90-30) 80
- constructing own lines	Find a small difference by counting up	<u>61</u> <u>100</u>
		<u>182</u>
(Teachers model jottings appropriate for larger numbers)	42 – 39 = 3	(Our de la Tama) en estinar 401a haun de rica
	+1 +2	(Summer Term) crossing 10's boundaries
		92 - 38 = 54
		02 00 01
		92
	39 40 42	38
		- <u></u>
	Summer Term	$00 \pm 2$ $> 80 \pm 12$
	Unit digits do not cross tens boundaries (without	$30 + 2 \longrightarrow 00 + 12$
		$\frac{50+0}{50+4}$ = $\frac{50+0}{50+4}$
	30 - 24 $42 - 21$	
	50 - 20 = 30 $340 - 20 = 10$	
	8 - 4 = 4 12 - $7 = 5$	
	<del>34</del> 15-	

Subtraction		
Year 4	Year 5	Year 6

Methad Methad     Pencil and paper procedures       Subtract 9 or 11. Add/subtract 19 or 21with confidence     Pencil and paper procedures       Use known number facts and place value to subtract     ************************************	- = signs and missing numbers Continue using a range of equations as in Year 3 but with appropriate numbers. Extend to 126 + 43 = 200 -	<u>- = signs and missing numbers</u> Continue using a range of equations as in Year 4 but with appropriate numbers. Extend to 186 + 137 = 420 -	<u>- = signs and missing numbers</u> Continue using a range of equations as in Year 5 but with appropriate numbers. Extend to 387 + 469 = 1200 -
Use known number facts and place value to subtract       *****         Pencil and paper procedure:       -17.8         (All Terms) Use decomposition       -17.8         ****       -17.8         ****       -17.8         ****       -17.8         ****       -17.8         ****       -17.8         ****       -17.8         ****       -17.8         ****       -17.8         *****       -17.8         ******       -17.8         ************************************	Mental Method Subtract 9 or 11. Add/subtract 19 or 21 with confidence	Pencil and paper procedures (All Terms)	<u>Pencil and paper procedures</u> (All Terms)
y'       - 38         54       Extend using larger numbers and decimal numbers         Extend using larger numbers and decimal numbers       Extend using larger numbers and decimal numbers         Extend using larger numbers and decimal numbers       Extend using larger numbers and decimal numbers         Extend using larger numbers and decimal numbers       Extend using larger numbers and decimal numbers         Multiplication       Year 1         Year 2       Year 3	<u>Use known number facts and place value to subtract</u> Pencil and paper procedure: (All Terms) Use decomposition	352 - $\frac{178}{174}$	$3 \times 5^{2}$ - $\frac{178}{174}$
Multiplication         Year 1       Year 2       Year 3	9 2 - <u>3 8</u> <u>5 4</u> Extend using larger numbers and <u>decimal numbers</u>	Extend using larger numbers and <u>decimal numbers</u>	Extend using larger numbers and <u>decimal numbers</u>
Multiplication       Year 1     Year 2     Year 3			
Multiplication           Year 1         Year 2         Year 3			
Multiplication       Year 1     Year 2     Year 3			
Year 1 Year 2 Year 3		Multiplication	
	Year 1	Year 2	Year 3





Division		
Year 1	Year 2	Year 3



Division		
Year 4	Year 5	Year 6
÷ = signs and missing numbers	÷ = signs and missing numbers	÷ = signs and missing numbers

Continue using a range of equations as in Year 3 but with appropriate numbers.	Continue using a range of equations as in Year 4 but with appropriate numbers.	Continue using a range of equations as in Year 5 but with appropriate numbers.
Pencil and paper procedures – Bus stop method – short division (All Terms)	<u>Pencil and paper procedures - Compact Method</u> (Autumn/Spring Term)	
146 $\div$ 8 is approximately 150 $\div$ 10 = 15	146 $\div$ 8 is approximately 150 $\div$ 10 = 15 This method to be used when multiplying by 1 digit	Continue with pencil and paper procedures for Year 5
$ \begin{array}{c} 0 1 8 r2 \\ 8 11466 \end{array} $	0 1 8 r2 8 1:4-6	<b>Remainders</b> Quotients expressed as fractions or decimal fractions $676 \div 8 = 84.5$
Extend by dividing by 7 and 9 and begin to show remainders as simple fractions e.g. $\frac{2}{8}$ is $\frac{1}{4}$	With Remainders Pencil and paper procedures – (Summer Term)	Pencil and paper procedures 977 ÷ 36 is approximately 1000 ÷ 40 = 25
Pencil and paper procedures - (Spring & <mark>Summer</mark> Term)	$\begin{array}{c} 0.1.8 \text{ r} \frac{1}{4} \text{ (or .25)} \\ 8 1_{1}4_{6}6 \end{array}$	Using chunking for division of larger number and dividing by 2-digit numbers as Year 5
Using chunking method for division for long division	Remainders	
552 ÷ 24 = 23	Return to chunking method for division by 2 digit numbers	
23 24 St 52	Quotients expressed as fractions or decimal fractions $61 \div 4 = 15 \frac{1}{4}$ or 15.25	
$\frac{-480}{72} (20 \times 24) (3 \times 24)$	$   \begin{array}{r}     23 r \frac{1}{3} \\     24 \overline{560} \\     - 480 (20 \times 24)   \end{array} $	
	<u>- 400</u> (20 x 24) 80 <u>- 72</u> (3 x 24)	
	8	