



St Peter's Brafferton CE (VA) Primary School Maths Written Calculations Policy (March 2017)

This calculation policy has been written in line with the Programmes of Study in the 2014 National Curriculum and is linked to the White Rose Maths hub which has problem solving and reasoning embedded throughout.

AIMS OF THE POLICY

- To ensure consistency and progression in our approach to calculation
- To ensure that children develop an efficient, reliable, formal written method of calculation for all operations
- To ensure that children can use these methods accurately with confidence and understanding

This policy concentrates on the introduction of standard symbols, the use of number lines to aid mental calculations and on the introduction of other pencil and paper procedures. It is important that children do not abandon jottings and mental methods once other pencil and paper procedures are introduced. Therefore children will always be encouraged to look at a calculation/problem and then decide which is the best method to choose - pictures, mental calculation with or without jottings or a structured recording. It is also important to reinforce learning with place value supports such as tens and hundred sticks and place value arrows in order for them to recognise the true value of the numbers. The long-term aim is for children to be able to select an efficient method of their choice (whether this be mental or a written or in upper Key Stage 2) that is appropriate for a given task. They will do this by always asking themselves:

- 'Can I do this in my head?'
 'Can I do this in my head using drawings or jottings?'
 'Do I need to use a pencil and paper procedure?'
 'How can I check my answer?'

The table below outlines the strategies introduced within the different year groups for the 4 operations Further explanation and examples of these strategies are shown on page 2-8 of this policy.

	Addition	Subtraction	Multiplication	Division
Foundation Stage	Using objects Songs/ reciting numbers Counting fingers 100 squares Numberlines	Using objects Counting fingers 100 squares Numberlines	Counting up in 2s, 5s, and 10s	Using Objects
Year 1	Counting fingers 100 squares Numberlines Counting on	Counting fingers 100 squares Numberlines Counting on & back	Counting in 2s, 5s and 10s Doubling Repeated addition	Drawings of groups Halving
Year 2	Numberlines 100 squares Partitioning	Numberlines 100 squares	Repeated addition Arrays Partitioning 2, 5 & 10 times tables Count in steps of 3	Drawings of groups Number lines Related division facts
Year 3 & 4	Partitioning Expanded column addition	Numberline Expanded subtraction	Partitioning Grid Multiplication Year 3: 2, 5, 10, 3, 4, 6 & 8 times tables Year 4: all times tables to 12x12	Chunking on number line Expanded column chunking Related division facts Year 4: Short division introduced

Year 5 & 6	Column addition with decimals	Column subtraction with decimals	Short multiplication Long multiplication	Short division Long division
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Please note that children working towards or exceeding the objectives of the year group may use strategies take from the year below or above in order to enhance learning.

Addition



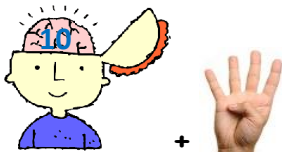
Nursery:

- Recognising numbers.
- Reciting numbers
- Using fingers to count on
- Singing songs related to number
- Counting objects to find a total.

Reception: & Year 1

- Counting objects to find a total.
- Number bonds to 10 and 20
- Count in ones using fingers.

$10 + 4$

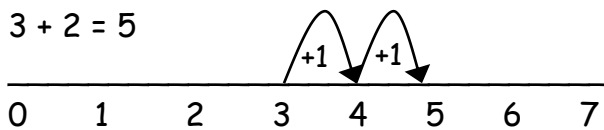


S.C:

I can put the largest number in my head.
I can put up the number of fingers I need to add on.
I can count up in ones from the number in my head.

- Using Numberlines to count in ones

$3 + 2 = 5$



S.C:

I can point to the largest number in the calculation on my numberline.
I can count on in ones so the number gets bigger.

- Using Hundred Squares:

$15 + 4 = 19$

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40

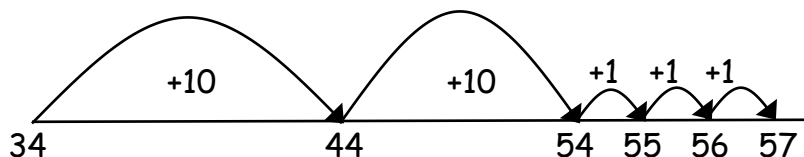
S.C:

I can point to the largest number in the calculation on my hundred square.
I can count on in ones so the number gets bigger.

Year 2

- Counting on or back in tens and ones from any number

$34 + 23 = 57$



S.C:

I can draw a numberline.
I can write the largest number at the start.
I can add on the correct number of tens.
I can add on the units.

- Using a hundred square

$$21 + 13 = 34$$

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

S.C:

I can point to the largest number in the calculation on a hundred square.

I can move down on the hundred square to add on tens.

I can add on ones by moving across to make the number bigger.

Partitioning

$$67 + 27 =$$

$$60 + 20 = 80$$

$$7 + 7 = 14$$

$$80 + 14 = 94$$

S.C:

I can write out how many tens and add them together.

I can write out how many units and add them together.

I can add the two totals together to make a grand total.



Year 3 & 4

- Expanded column addition

$$345 + 716$$

$$\begin{array}{r} 300 \quad 40 \quad 5 \\ + 700 \quad 10 \quad 6 \\ \hline 1000 \quad 60 \quad 1 = 1061 \\ \quad \quad \quad 10 \end{array}$$

S.C:

I can partition the two numbers into H, T, U
I can write the numbers above each other in the correct columns.

I can add the units first, then tens then hundreds.

I can write the total below the numbers I added.

I can carry the T or H across to the next column to the left.

- Column addition involving carrying

$$\begin{array}{r} 3587 \\ + 675 \\ \hline 4262 \\ 1 \quad 1 \quad 1 \end{array}$$

$$\begin{array}{r} 5097 \\ 3129 \\ + 2877 \\ \hline 11103 \\ 1 \quad 2 \quad 2 \end{array}$$

S.C:

I can write the numbers above each other in the correct columns.

I can add the units first and then tens, then hundreds, then thousands.

I can carry any T, H or Th into the next column by marking a 1 below the line.

Year 4

- Column addition involving carrying and numbers to 1dp

$$\begin{array}{r} 28.5 \\ + 18.7 \\ \hline 47.2 \\ 1 \quad 1 \end{array}$$

Year 5 and above

- Column addition involving numbers with 3dps.

$$\begin{array}{r} 3.587 \\ + 1.675 \\ \hline 5.262 \\ 1 \quad 1 \quad 1 \end{array}$$

S.C:

I can write the numbers above each other in the correct columns.

I can add the thousandths first and then hundredths, then tenths, then units.

I can carry any thths, hth, ths, U into the next column by marking a 1 below the line.

- Column addition involving numbers with 3dps (adding more than 2 numbers).

$$\begin{array}{r} 2.715 \\ 3.587 \\ + 1.675 \\ \hline 7.977 \\ \hline 1\ 1\ 1 \end{array}$$
- Column addition involving numbers with mixed decimal amounts eg. $34.7+21.53$

Year 6 and above

- Column addition involving brackets (BIDMAS) and negative numbers.

Subtraction

Nursery:

- Reciting numbers
- Handling objects and taking some away to see what is left.



Reception:

- Handling objects for subtraction
- Taking away in ones using fingers.

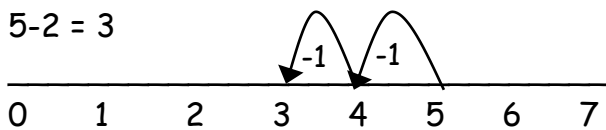
$4 - 2 = 2$



(putting 2 fingers down)

- Using Numberlines to count back in ones

$5 - 2 = 3$



S.C:

I can put my finger on the largest number.
I can count back in ones so the number gets smaller.

- Using Hundred Squares to count back in ones:

$10 - 3 = 7$

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40

S.C:

I can point to the largest number in the calculation on my hundred square.
I can count on in ones

Year 5 & 6

- Column subtraction using 4 and 5 whole digit numbers
- Column subtraction using decimals with 1, 2 and 3 decimal places.
- Subtraction using negative numbers.

Multiplication



Reception:

Counting in 2s, 5s and 10s.

Year 1/2:

Knowing multiplication facts from the 2, 5 and 10 times tables.

Doubling with objects:

$$2 \times 4 = \text{○○○○} \quad \text{○○○○}$$

Repeated addition:

$$3 \times 5 = 5+5+5 = 15$$

$$4 \times 4 = 4+4+4+4 = 16$$

Arrays are introduced (2, 5 and 10)

Year 2:

Knowing multiplication facts from the 2, 5 and 10 times tables and associated division facts.

Beginning to be able to count up in groups of 3 and 4.

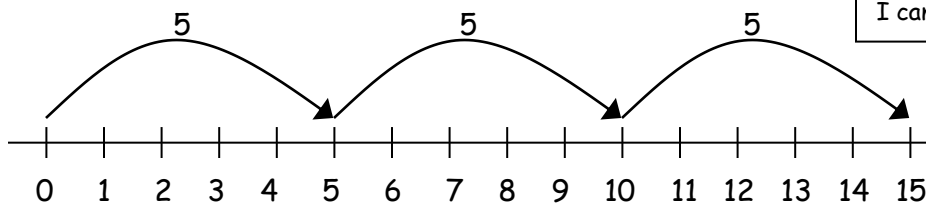
Repeated addition:

$$6 \times 4 = 6+6+6+6 = 24$$

$$4 \times 8 = 8+8+8+8 = 32$$

Repeated addition can be shown easily on a number line:

$$5 \times 3 = 5 + 5 + 5$$



S.C:

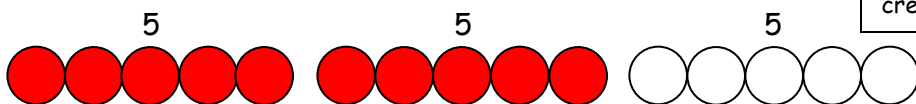
I can draw a numberline.

I can count up in jumps of the number I am multiplying by.

I can count how many jumps I made.

and on a bead bar:

$$5 \times 3 = 5 + 5 + 5$$



S.C:

I can gather beads together in the number that I am multiplying by.

I can count the number of groups of beads I created.

Arrays:

$3 \times 8 = 24$



Partitioning:

$15 \times 3 =$

$10 \times 3 = 30$

$5 \times 3 = 15$

$$\begin{array}{r} 30 \\ + 15 \\ \hline 45 \end{array}$$

S.C:

I can partition the 2-digit number.

I can multiply both partitioned numbers by the number I am multiplying by.

I can add the answer together to get a final answer.

Year 3:

Knowing multiplication facts for the 2, 5, 10, 3, 4, 6 and 8 times tables with associated division facts for the 2, 5, 10, 3 and 4 times tables.

Using partitioning knowledge to complete grid multiplication:



Year 3 & 4:

Partitioning:

$36 \times 7 =$

$30 \times 7 = 210$

$6 \times 7 = 42$

$$\begin{array}{r} 210 \\ + 42 \\ \hline 252 \end{array}$$

S.C:

I can partition the 2-digit number.

I can multiply both partitioned numbers by the number I am multiplying by.

I can place the answers in the correct box in the grid.

I can add the answer together to get a final answer.



Grid method:

$223 \times 8 =$

x	200	20	3	
8	1600	160	24	1600

$$\begin{array}{r} 1600 \\ 160 \\ + 24 \\ \hline 1784 \end{array}$$

S.C:

I can draw a grid.

I can partition the larger number.

I can multiply each number by the number I am multiplying by.

I can add up all the totals.

Grid method:

$$23 \times 18 =$$

x	20	3
10	200	30
8	160	24



$$\begin{array}{r} 200 \\ 160 \\ 30 \\ + 24 \\ \hline 414 \\ \hline \end{array}$$

Year 4:

Knowing multiplication facts for all the timetables up to 12x12 with some knowledge of associated division facts.

Year 5 & 6:

Year 5:

Knowing multiplication facts at speed for the all the times tables 1-12 and associated division facts and also the squared times table.

Year 5 and above:

Column multiplication:

$$\begin{array}{r} 25 \\ \times 7 \\ \hline 35 \\ 140 \\ \hline 175 \end{array}$$

S.C:

I can write the largest number above the smallest number.

I can multiply the units first.

I can place a zero as a place holder below the answer of the units.

I can multiply to 10s and write the answer underneath the U answer.

I can add the two numbers together.

- Column multiplication including TuxU, HTUxU, TuxTU
- Multiplication including decimals.

Year 6:

Knowing all multiplication facts and relating these to decimals, and also know the squared and cubed times tables.

Use short multiplication and long multiplication (standard methods) as recommended in the 2014 National Curriculum.

Division

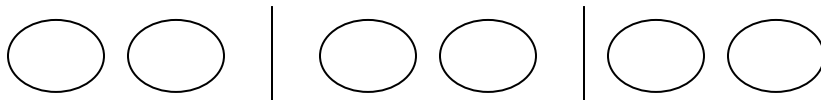


Year 1 & 2:

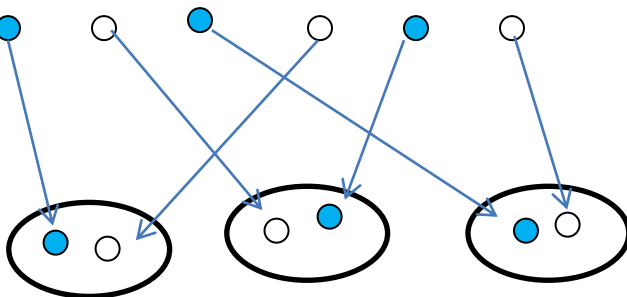
Halving numbers up to 10 and 20

Sharing using objects:

6 divided by 3 - 6 sweets divided between 3 people



Sharing using pictures: $6 \div 3 =$

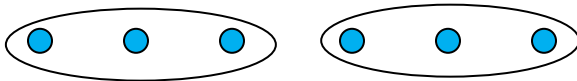


S.C:

I can draw the right number of circles for the number I am dividing by.
I can put one dot in each circle and keep counting up until I reach the largest number in the calculation.
I can count how many dots are in each group.

Year 2 & 3:

Grouping with pictures: $6 \div 3 = 2$



Grouping pictures with remainders: $8 \div 3 = 2 \text{ r } 2$

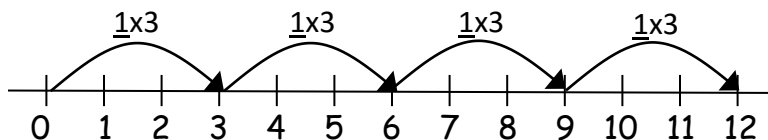


S.C:

I can draw the right number of dots for the largest number in a row.
I can group the dots on the row according to the divisor.
I can count how many dots in each group.
I can write the number left as a remainder (r).

Numberline - jumping in groups (counting up in the divisor until target number is reached, how many groups/ jumps did we make):

$12 \div 3 = 4$



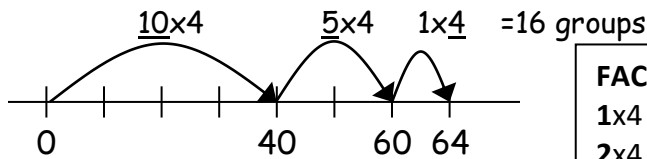
S.C:

I can draw a numberline from 0 to the largest number in calculation.
I can jump along the numberline in groups of the divisor until I reach the end of the numberline.
I can count up the number of groups.

Year 3 & 4:

Numberline - Chunking (choosing a multiple of the divisor to chunk off at a time, until target number is reached or as close to target number as possible with remainders):

$$64 \div 4 = 16$$



FACTS:
 $1 \times 4 = 4$
 $2 \times 4 = 8$
 $5 \times 4 = 20$
 $10 \times 4 = 40$

S.C:
I can draw a numberline from 0 to the largest number in calculation.
I can draw a fact box and write in the known facts for 2x, 5x and 10x.
I can use the fact box to chunk the number of groups I make until I reach the end of the numberline.
I can count up the number of groups.

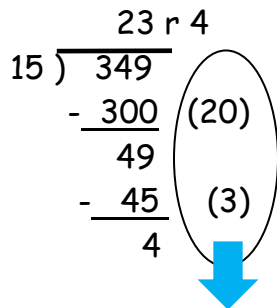


Year 5 & 6:

Short and long division

Expanded chunking method:

$$349 \div 15 =$$



Answer : 23 r4 or 23 4/15

Short division (bus stop method):

$$96 \div 6 =$$
$$\begin{array}{r} 16 \\ 6 \overline{) 96} \end{array}$$

S.C:
I can write the calculation using the 'bus stop' method.
I can divide into the first digit in the shelter.
I can place the remainder in front of the next digit.
I can keep going until I get to the final answer and record any remainders.

(6 goes in 9 once, with a remainder of 3, which gets carried in front of the 6 units making 36. 6 goes into 36 six times.)

Year 6:

- Short and long division including dividing by decimals and also giving remainder as a decimal and a fraction.

Policy agreed: March 2017

Policy reviewed: March 2020

S. Anderson

Maths Subject Leader