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

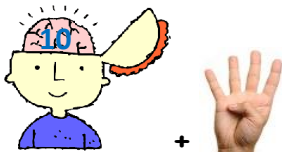| Year 5 & 6	Column addition with decimals	Column subtraction with decimals	Short multiplication Long multiplication	Short division Long division

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.
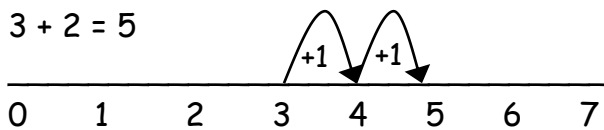- Number bonds to 10 and 20
- Count in ones using fingers.

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

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

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

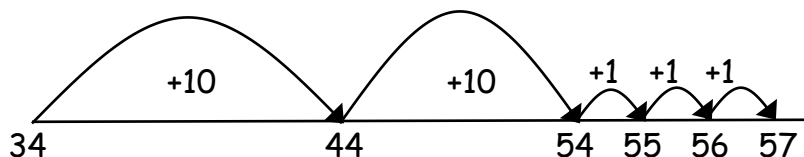| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40

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

| 34 | | 44 | | 54 | 55 | 56 | 57 |

+10   +10   +1 +1 +1

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
									50

Partitioning

67 + 27 =

60 + 20 = 80

7 + 7 = 14

80 + 14 = 94

Year 3 & 4

- Expanded column addition

345 + 716

```
    300      40       5
  + 700      10       6
  -----------------------
   1000      60       1  = 1061
             10
```

- Column addition involving carrying

```
   3587
 +  675
 ------
   4262
   1 1 1
```

```
   5097
   3129
 + 2877
 ------
 11,103
  1 2 2
```

Year 4

- Column addition involving carrying and numbers to 1dp

```
   28.5
 +18.7
 -----
   47.2
   1 1
```

Year 5 and above

- Column addition involving numbers with 3dps.

```
   3.587
 + 1.675
 -------
   5.262
   1 1 1
```

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

```
  2.715
  3.587
+ 1.675
  7.977
  1  1 1
```

- 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
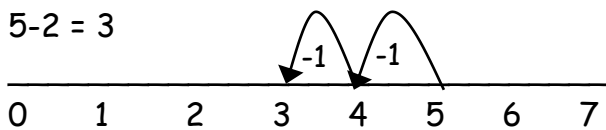- Taking away in ones using fingers.

4 – 2 = 2

(putting 2 fingers down)

- Using Numberlines to count back in ones

5-2 = 3

0   1   2   3   4   5   6   7

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

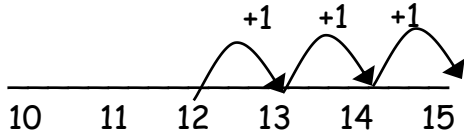S.C:
I can point to the largest number in the calculation on my hundred square.
I can count on in ones
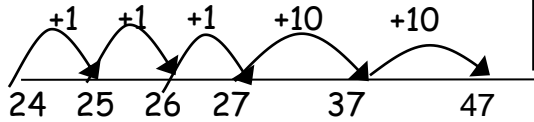
- Counting on and find the difference using larger numbers

$15 - 3 = 12$

$$+1 \quad +1 \quad +1$$

10   11   12   13   14   15

Year 2 & 3

- Counting on and find the difference

$47 - 23 = 24$

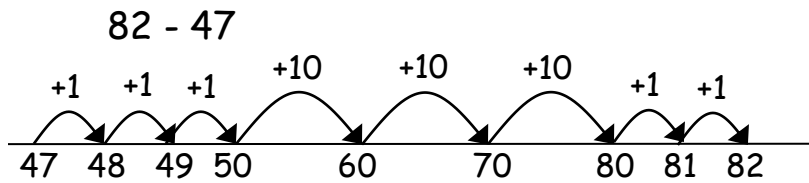$$+1 \quad +1 \quad +1 \quad +10 \quad +10$$

24 25 26 27   37   47

S.C:
I can draw a numberline.
I can put the largest number at the end.
I can count on in tens.
I can count on in ones.

Year 3 & 4
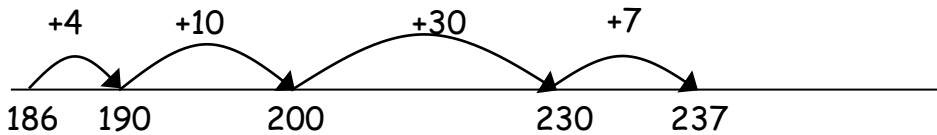
- Counting up number line – transition as above but focus is on finding the difference between two numbers by counting up:

$82 - 47$

$$+1 \quad +1 \quad +1 \quad +10 \quad +10 \quad +10 \quad +1 \quad +1$$

47 48 49 50   60   70   80 81 82

S.C:
I can draw a numberline.
I can put the smallest number first and the largest number at the end.
I can count up in ones to the nearest multiple of 10.
I can count up in tens to get closer the number.
I can add up the difference between the two numbers.

- Recognising when the use the finding the difference or counting back method using larger numbers. Grouping 10s when needed.

$237 - 186$

$$+4 \quad +10 \quad +30 \quad +7$$

186   190   200   230   237

S.C:
I can draw a numberline.
I can put the smallest number first and the largest number at the end.
I can count up by chunking the ones to get to the nearest multiple of 10.
I can count up in tens to get closer the number number.
I can add up the difference between the two numbers.

- Expanded Subtraction.

$$\begin{array}{ccc}
^{100} & & \\
\cancel{200} & ^{1}30 & 7 \\
100 & 80 & 6 \\
\hline
 & 50 & 1 \\
\end{array}$$

S.C:
I can partition the two numbers into H, T, U.
I can write the largest number above the smallest number starting with the units.
I can take the bottom numbers away from the top numbers.
I can borrow 10 from the T column and 100 from the H column if I need to.

Year 4 & above

- Column subtraction involving borrowing and decimals

$$\begin{array}{c}
^{1} \\
6\,4\,1 \\
\cancel{7}\cancel{5}4 \\
-\ 286 \\
\hline
468 \\
\end{array}$$

S.C:
I can write the largest number above the smallest number.
I can take the bottom numbers away from the top numbers.
I can borrow 10 from the T column and 100 from the H column if I need to.

- Column subtrction 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 x 4 = ○○○○   ○○○○

Repeated addition:
3 x 5 = 5+5+5 =15   4 x 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.
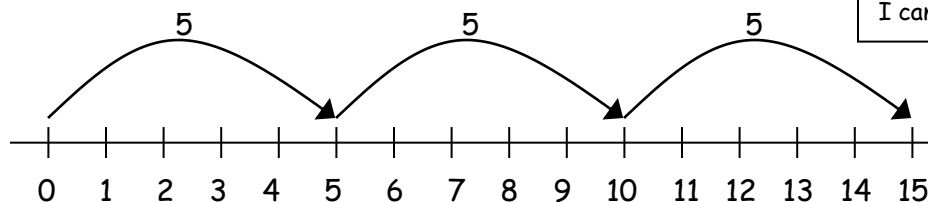**Beginning to be able to count up in groups of 3 and 4.**
Repeated addition:
6 x 4 = 6+6+6+6 = 24   4 x 8 = 8+8+8+8 =32

Repeated addition can be shown easily on a number line:
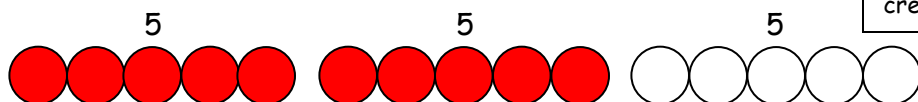5 x 3 = 5 + 5 + 5

and on a bead bar:
5 x 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.

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 x 8 = 24

⊗⊗⊗⊗ ⊗⊗⊗⊗ ⊗⊗⊗⊗
⊗⊗⊗⊗ ⊗⊗⊗⊗ ⊗⊗⊗⊗

Partitioning:

15 x 3 =

10 x 3 = 30   30
5 x 3 = 15   + 15
                        45

Year 3:

Knowing muliplcation 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:

×	10	5
3	30	15

→ 30 + 15 = 45

Year 3 & 4:

Partitioning:

36 x 7 =

30 x 7 = 210 →   210
 6 x 7 = 42   + 42
                      252

✖

Grid method:

223 x 8 =

×	200	20	3
8	1600	160	24

→

        1600
         160
       + 24
        1784

Grid method:

23 x 18 =

×	20	3
10	200	30
8	160	24

➡

$$200$$
$$160$$
$$30$$
$$+ \ 24$$
$$\underline{41\ 4}$$
$$1$$

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 aasociated division facts and also the squared times table.

Year 5 and above:
Column multiplication:

$$25$$
$$\underline{\times\ 7}$$
$$35$$
$$\underline{140}$$
$$\underline{175}$$

> **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 sqaured and cubed times tables.

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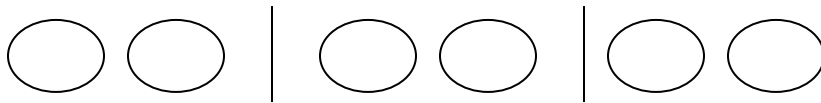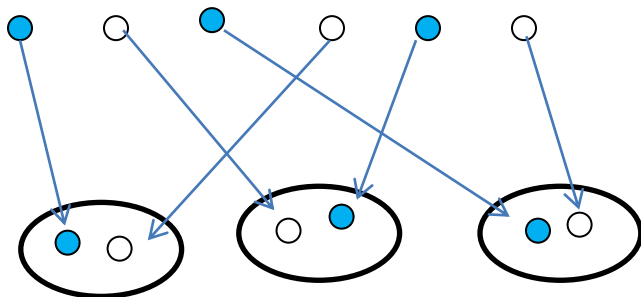
Division

Year 1 & 2:
Halving numbers up to 10 and 20

Sharing using objects:
6 divided by 3 – 6 sweets divided between 3 people
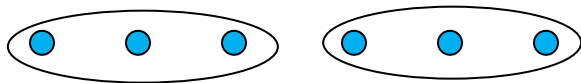
Sharing using pictures: 6÷3 =

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.
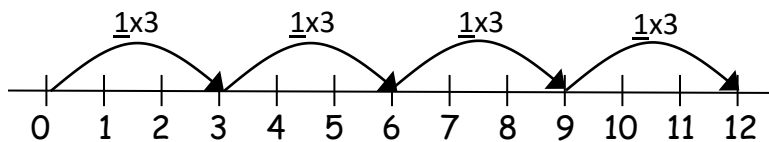
Year 2 & 3:
Grouping with pictures: 6 ÷ 3 = 2

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).

Grouping pictures with remainders: 8 ÷ 3 = 2 r 2

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

$12 \div 3 = 4$

1x3   1x3   1x3   1x3
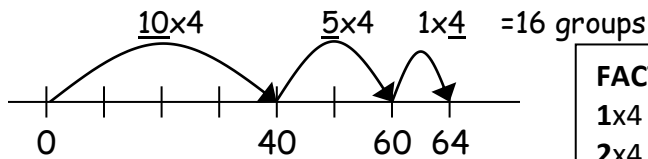
0 1 2 3 4 5 6 7 8 9 10 11 12

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.

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):

$64 \div 4 = 16$

10x4   5x4   1x4   =16 groups

0   40   60 64

FACTS:
1x4 = 4
2x4 = 8
5x4 = 20
10x4 = 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.
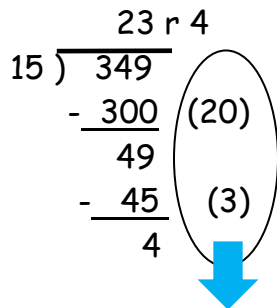I can count up the number of groups.

Year 5 & 6:
Short and long division

Expanded chunking method:

$349 \div 15 =$

```
           23 r 4
     15 )  349
         -  300   (20)
            49
         -   45    (3)
             4
```

Answer :   23 r4 or 23 4/15

Short division (bus stop method):

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.

96 ÷ 6 =

```
        1 6
   6 )  9³6
```

(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 divison 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