Cogenhoe Primary School Calculation Policy

This calculation policy has been written to ensure consistency and progression across the school in the teaching and learning of the four operations in Mathematics.

The Aim –

1) For children to be shown a range of calculation methods throughout their time at Cogenhoe.
2) For children to engage in a two-way dialogue with teachers and peers about the methods being used.
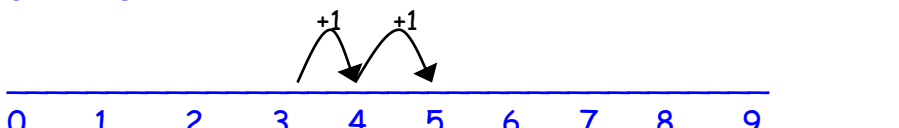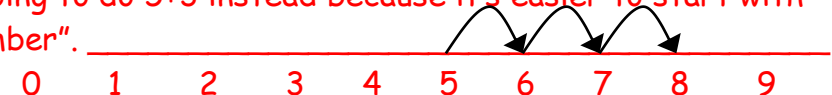3) For children to select preferred methods and to have the confidence to use these methods independently.

Points to remember

Use of Number lines – jumps should be shown on the number line – with jumps above the number line for addition and under the number line for subtraction.
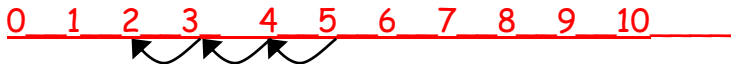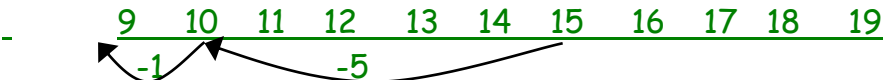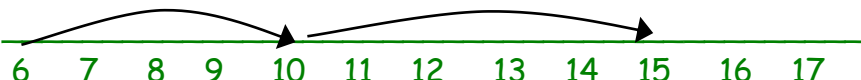
The inverse – children should be encouraged (when appropriate) to use the inverse for checking subtraction and division.
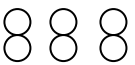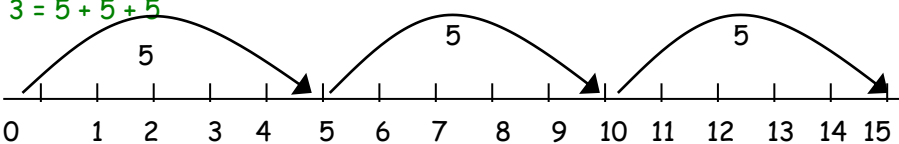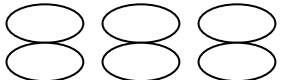
Calculation Policy- Addition
By the end of each Stage:

EYFS Stage -To be able to use quantities and objects to add two single digit numbers and count on to find the answer.	**Stage 1** –To be able to add one digit and two digit numbers to 20 including 0.
and =1,2,3,4,...5 3 + 2 = 5 +1 +1 0 1 2 3 4 5 6 7 8 9	**Always start with the biggest number and count on** 3 + 5 = "I'm going to do 5+3 instead because it's easier to start with the bigger number". _____ 0 1 2 3 4 5 6 7 8 9
Stage 2 -To begin to move from a pictorial representations to a more formal columnar method.	**Stage 3** –To be able to add numbers with up to 3 digits using a formal written method of columnar addition.

Stage 2:

Bridging 10s-break down the units 19+ 13=19+1+2+10=32

19 20 21 22 23 24 25 26 27 28 29 30 31 32

NB – 100 squares and Base 10 materials to be used too.

Partitioned column method. 67 + 42 =

 60 + 7
 40 + 2
100 + 9 = 109

Stage 3:

Partitioned informal method	Partitioned column method.
267 + 127 = ? **O** 7 + 7 = 14 **T** 60 + 20 = 80 **H** 200 + 100 = 300 14 + 80 + 300 = 380 + 10 + 4 = 394	200+60+7 100+ 20+7 300 +80+14 394

Stage 4–To be able to add numbers with up to 4 digits using an extended column method.	**Stage 5** – To be able to add whole numbers and decimals with more than 4 digits using a compact written method (column addition).	**Stage 6**–To be able to solve addition and subtraction multi step problems in context, deciding which methods to use and why.

1267
 + 2127
     14 (7+7)
     80 (60 + 20)
   300 (200+100)
  3000 (1000+2000)
  3394
	1358 1.358
	 + 3473 + 3.473
	 4831 4.831
	  1 1 1 1	
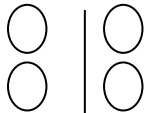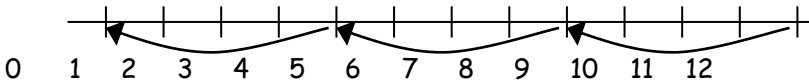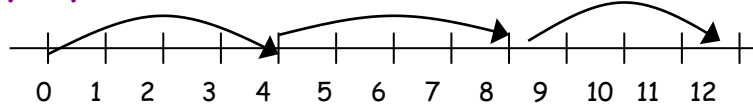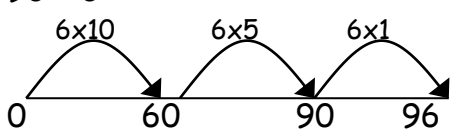
Calculation Policy - Subtraction

EYFS Stage – To be able to use quantities and objects to subtract two single digit numbers and count back to the find the answer.	**Stage 1-** To be able to subtract one digit and two digit numbers to 20 including 0.
Counting Back Understand subtraction as 'taking away' three take away 2 leaves….1 dog.	**You can count backwards on a number line.** 5-3 = 2 0 1 2 3 4 5 6 7 8 9 10 -1 -1 -1 OR start with 3 and count on to 5. The difference is 2.

Stage 2 - To be able to subtract numbers with up to 2 digits using a number line. **2.Using a number line to take away – bridging tens.** 15 – 6 = 15 – 5 -1 = 9 9 10 11 12 13 14 15 16 17 18 19 -1 -5 **Count up – subtraction as finding the difference** +4 +5 6 7 8 9 10 11 12 13 14 15 16 17	**Stage 3** – To be able to subtract 3-digit numbers using a partitioned written method.	
	Horizontal partitioning 253 – 117 253 – 7 = 246 246– 10 = 236 236-100= 136 **NB** Only partition the smaller number to avoid negatives.	**Column partitioned method** 253 – 117 40 13 200 + 50 + 3 - 100+ 10+ 7 100 + 30 + 6 136

Stage 4- To be able to subtract 4-digit numbers using a partitioned column method.	**Stage 5** –To be able to subtract numbers and decimals with more than 4 digits using a compact formal written method (column subtraction).	**Stage 6** – To be able to solve subtraction and addition multi step problems in context, deciding with operations and methods to use and why.
3253 – 1117 40 13 3000+ 200 + 50 + 3 - 1000+ 100+ 10+ 7 2000+ 100 + 30 + 6 2136	6 14 14 3754 - 1286 2468 6 14 14 3.754 - 1 286 2.468	

Calculation Policy- Multiplication

EYFS -To be able to solve problems including doubling objects.	**Stage 1** –To be able to solve one step multiplication problems using objects, pictorial representations and arrays with support.
Doubling: Giving double the amount of objects.	⊗⊗ ⊗⊗ ⊗⊗ **3 lots of 2 = 6.**

Stage 2 – To understand multiplication using arrays and repeated addition.	**Stage 3** –To be able to multiply 2-digit by 1-digit using a partitioned written method.

Counting - Count objects by grouping them in 2s, 5s or 10s

Repeated addition

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

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Arrays

$2 \times 3 =$ ⬭⬭⬭ ⬭⬭⬭ ⬭⬭⬭

Grid Method

$38 \times 3 =$

X	30	8
3	90	24

$= 90 + 24 = 90 + 20 + 4 = 114$

Partitioned method

```
    30 + 8
X       3
   24(3x8)
   90 (3 x 30)
  114
```

Stage 4–To be able to multiply three-digit numbers by a one-digit number using a partitioned written method.	**Stage 5** – To be able to multiply 4-digt numbers by a one/ two digit number using a formal written method.	**Stage 6** – To be able to multiple multi-digit numbers up to 4 digits by a 2 two digit number using the formal written method of long multiplication.

Partitioned written Method

```
   200+30+8
X          3
   24(3x8)
   90 (3 x 30)
  600 (3 x 200)
  714
```

```
     1238
X        3
   24(3x8)
   90 (3 x 30)
  600 (3 x 200)
 3000 (3 x1000)
 3714
```

```
      1238
X        13
   24(3x8)
   90 (3 x 30)
  600 (3 x 200)
 3000 (3 x 1000)
   80 (10 x 8)
  300 (10 x 30)
 2000 (10 x 200)
10000 (10 x 1000)
16094
```

```
   1325
X  27
  9275
 26500
 35775
```

Calculation Policy- Division

EYFS – To be able to solve problems including halving and sharing.	**Stage 1** – To be able to solve one step problems involving division, using concrete objects and pictorial representations.
Sharing – giving out objects so that everyone gets the same amount.	**Halving** – using objects/ shapes/ pictures **Sharing** – giving out objects so that everyone gets the same amount.
Stage 2 – To understand the division (÷) sign as sharing/ grouping.	**Stage 3** – To be able to divide 2-digit by 1-digit using repeated subtraction.

1. Sharing/ grouping - 6 divided by 3 – 6 sweets divided between 3 people 2. **Halves** – half of 4 is 2 – To learn halves to 20	**Division as repeated subtraction** 12 divided by 4 = 3 0 1 2 3 4 5 6 7 8 9 10 11 12 **Division by repeated addition to check** 0 1 2 3 4 5 6 7 8 9 10 11 12

Stage 4–To be able to divide 3-digit by 1 digit using chunking.	**Stage 5**– To be able to divide up to 4 digits by a 1 digit number using the written method of short division.	Stage 6 - To be able to divide numbers with up to 4 digits by a 2 digit number using long division and interpret remainders as fractions/decimals.
Chunking on a number line $96 \div 6$ 6x10 6x5 6x1 0 60 90 96 Answer : 16 **Optional Challenge - Vertical chunking** 16 6) 96 $-60 \qquad 10\times$ 36 $-36 \qquad 6\times$ 0	**Partitioning** 96 divided by 6 = (60 + 30+ 6) divided by 6 = 60 divided by 6 = 10 30 divided by 6 = 5 6 divided by 6 = 1 10+5+1 = 16	**Short division** $1\ 6$ $6\ )9_3\ 6$	**Long Division** $0\ 3\ 2\ 7\ r3$ 6)1 9 6 5 18 $1\ 6$ $1\ 2$ $4\ 5$ $4\ 2$ 3 r 3/6 =1/2 = 0.5