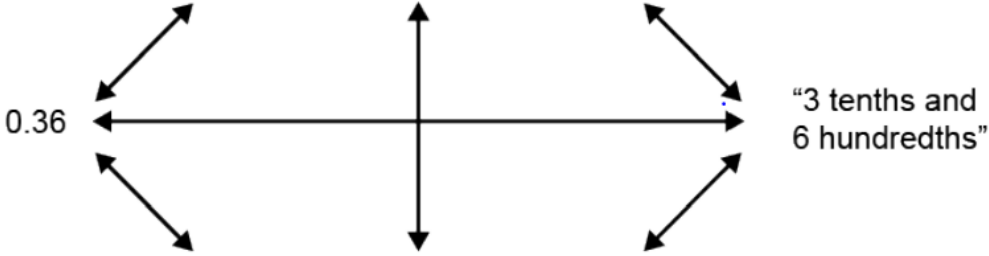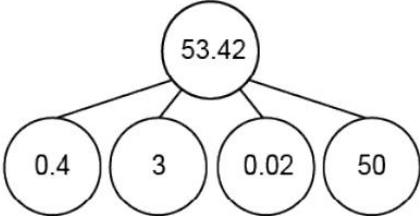# Hugglescote Calculation Policy

Progression in Calculations at Hugglescote- reviewed 2021 (with reference to 2020 Ready to Progress Government Guidance and other local schools)

Number and Place Value

Objective and link to RTP criteria	Concrete	Pictorial	Abstract
Know the place value of decimals to 2 decimal places/ decimal fractions and larger numbers up to 1 million/ 10 million Year 5 NPV–2 Recognise the place value of each digit in numbers with up to 2 decimal places, and compose and decompose numbers with up to 2 decimal places using standard and nonstandard partitioning. Year 6 NPV–2 As above including decimal fractions and	Use place value counters to make decimals and to show their value. 0.1 0.1 0.1 0.01 0.01 0.01 0.01 0.01 0.01 0.36 ⟷ "3 tenths and 6 hundredths" Use a Gattegno chart to show the relationship between whole numbers and decimals place value.		Show decimal numbers using a part part whole model. 53.42 0.4 3 0.02 50 Match up fractions and decimals.

numbers up to 10 million

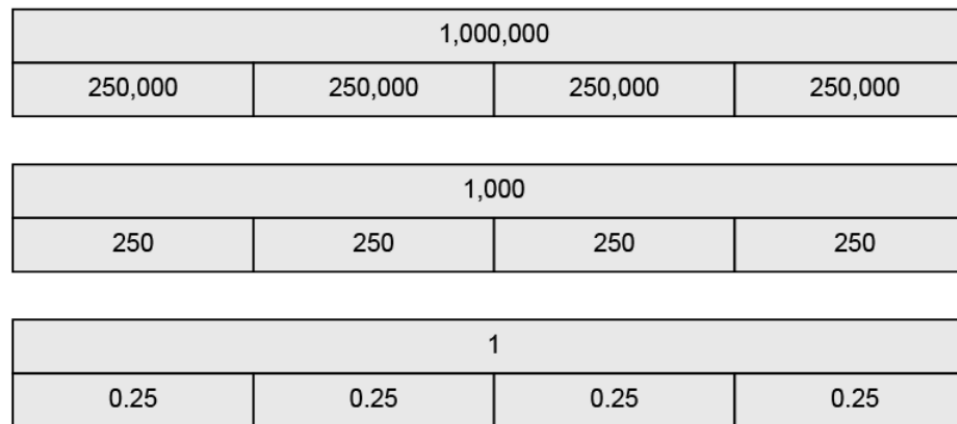| 1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09

0.20 $\frac{2}{100}$

0.02 $\frac{21}{100}$

0.12 $\frac{2}{10}$

0.21 $\frac{12}{100}$

Identify decimals on a number line and round to the nearest 1 or 0.1
Choose to round as appropriate

Year 5 NPV–3 Reason about the location of any number with up to 2 decimals places, including identifying the previous and next multiple of 1 and 0.1 and rounding to the nearest of each.

Year 6 NPV–3 As above including numbers up to 10 million and decimal fractions

Count forward and back in tenths and hundredths from any number and identify which whole number or tenth is before and after a given number. Use number lines to help.
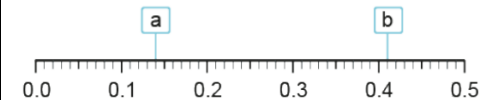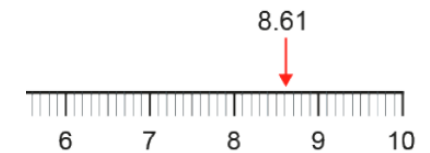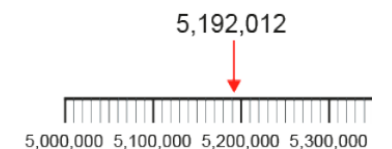
0   0.05 0.1 0.15 0.2 0.25 0.3 0.35 0.4 0.45 0.5 0.55

Look at bar models to see the relationships between different numbers.

1,000,000			
250,000	250,000	250,000	250,000

1,000			
250	250	250	250

1			
0.25	0.25	0.25	0.25

Identify decimals on a number line.

a   b

0.0   0.1   0.2   0.3   0.4   0.5

Find the nearest whole and the nearest tenth and round to the nearest whole and the nearest tenth.

8.61

6   7   8   9   10

Identify numbers on a number line.

5,192,012

5,000,000 5,100,000 5,200,000 5,300,000

| Understand the relationship between powers of 10

Year 6 NPV–1
Understand the relationship between powers of 10 from 1 hundredth to 10 million (multiply and divide by 10, 100 and 1,000). | Count forwards and backwards, and complete number sequences, in steps of powers of 10 (1, 10, 100, 1,000, 10,000 and 100,000). Pay particular attention to counting over 'boundaries', for example:

• 2,100,000   2,000,000   1,900,000
• 378,500   379,500   380,500

previous multiple of 1,000,000   next multiple of 1,000,000

5,000,000 < 5,192,012 < 6,000,000 | Complete missing number equations:

1,000 x 4.2 = _____
6.3 x 100 = _____
75 = 750,000 divided by ___
0.01 x _____ = 7 |

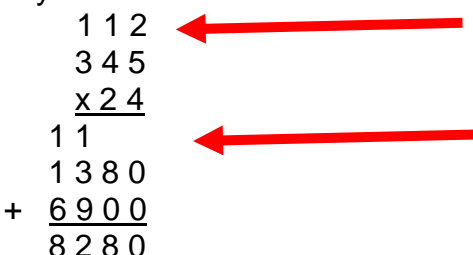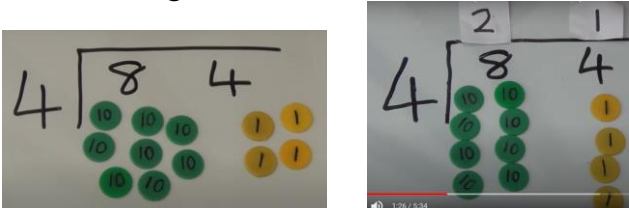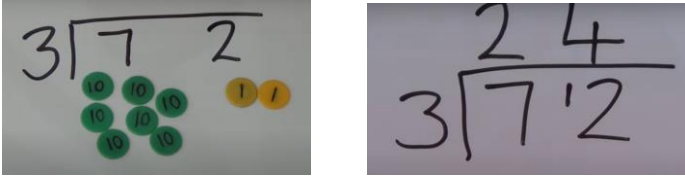# Addition and Subtraction

Objective and link to RTP criteria	Concrete	Pictorial	Abstract

Choose an efficient method either mental or written
 	
(Year 5 and Year 6)
	Ask children to choose which methods mental or written they use in order to solve a range of number and written problems.
	
	Children could sort cards into two groups labelled: 'solve mentally' or ' with a written method'.
	
	Children could write on a post it their choice of method and why they have chosen it. Discuss and display the most efficient strategies.
		Give children opportunities to solve missing number problems in order to demonstate secure understanding of written calculations.
		
		  2 6 2 7 ☐ 4
		+ 3 ☐ 1 – 6 . 2
		─────── ───────
		  5 8 3 ☐ 3 2
			If using written methods use compact and record exchanging as above. e.g.
			
			  1 1 1
			  172.83
			+ 54.68
			─────────
			  227.51

Multiplication and Division

Objective and link to RTP criteria	Concrete	Pictorial	Abstract

Use formal written multiplication Choose appropriate method to multiply	Children will benefit from seeing formal written multiplication and steps for how to do this displayed on working walls as reminders.
	
	Exchanging must be shown above columns.
	
	    1 1 2 ←
	      3 4 5
	   x 4
	   1 3 8 0
			Children should first be shown multiplying up to 4 digits by 1 digit and how to record this in formal written multiplication before moving on to multiplying by 2 digits and multiplying decimals.

5MD–3 Multiply any whole number with up to 4 digits by any one-digit number using a formal written method.	When ready move children on to:
	
	    1 1 2 ⬅
	    3 4 5
	    x 2 4
	  1 1 ⬅
	  1 3 8 0
	+ 6 9 0 0
	  8 2 8 0
		Children should be asked to choose appropriate methods to multiply mental or written.

Formal written short division introduced Year 4, consolidated Year 5. Choose appropriate methods. Year 4 NF–2 Solve division problems, with two-digit dividends and one-digit divisors, that involve remainders 5MD–4 Divide a number with up to 4 digits by a one-digit number using a formal written method.	Start by asking children to divide using place value counters alongside introducing the formal short division method. Start with divisions with no exchanging. Move on to divisions that require exchanging. Useful model: Short division / bus stop method division with place value counters - Bing video	Children should move on to recording short divisions and solving them without place value counters. They should always start by dividing the highest value digit. Exchanging should be recorded as a small digit in front of the digit in the column it is being exchanged into. Remainders should be recorded as a r until children are able to show remainders as a fraction or decimal fraction.

Formal written long division to divide numbers by 2 digits. Introduced in Year 6.	Begin by reminding children they can count in multiples to divide and reminding them how to record exchanging using a simple example, with no remainder. e.g.	Display examples and steps to success on working walls.

Formal written long division to divide numbers by 2 digits. Introduced in Year 6.

Begin by reminding children they can count in multiples to divide and reminding them how to record exchanging using a simple example, with no remainder.
e.g.

$$30 \overline{) 6 \; {}^6 0} = 0 \; 2$$

Move on to larger numbers still with a simple divisor and no remainder.
e.g.

$$30 \overline{) 1 \; {}^1 5 \; {}^{15} 0} = 0 \; 0 \; 5$$

Move on to an example with a simple divisor that gives a remainder.
Record how much is left to be divided as shown below.

$$30 \overline{) 8 \; 5}$$ = 2 r 25
$$\underline{6 \; 0}$$
$$2 \; 5$$
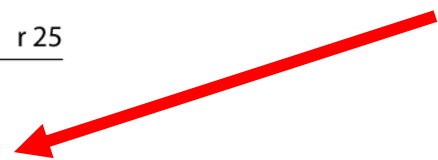
Finally move on to more complicated divisors, which require children to fully understand the process.

$$32 \overline{) 2 \; 9 \; 5}$$ = 9 r 7
$$\underline{2 \; 8 \; 8}$$
$$0 \; 0 \; 7$$

$$24 \overline{) 528}$$ = 22
$$\underline{-48}$$
$$48$$
$$\underline{-48}$$
$$0$$

Children should use multiplicative reasoning to help. Here children could use 32 x 10 = 320 to work out 32 x 9 = 288 making the first long division more efficient. They could use 2 x 24 = 48 to solve the second efficiently, this is close to 2 x 25 is 50 so here estimation may help as well..
Useful NCETM guidance: Division: dividing by two-digit divisors | NCETM

Display examples and steps to success on working walls.

Children should always start by dividing the highest value digit. Exchanging should be recorded as a small digit in front of the digit in the column it is being exchanged into.

Remainders should be recorded as a r until children are able to show remainders as a fraction or decimal fraction.

When children are secure they can move on to more complicated divisors and dividends

Year 6 Purple