This document is the calculation policy for the Ingrow and Long Lee Federation which lists the progression through addition and subtraction. YR, Y1 and Y2 are mostly working mentally (which means using concrete resources to build conceptual understanding of the operations). The signs and number sentences for addition and subtraction are introduced throughout year 1. During year 3 the formal written methods for subtraction and addition are introduced as the children are working with numbers which demand this. Mental mathematics runs throughout with the children be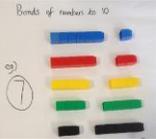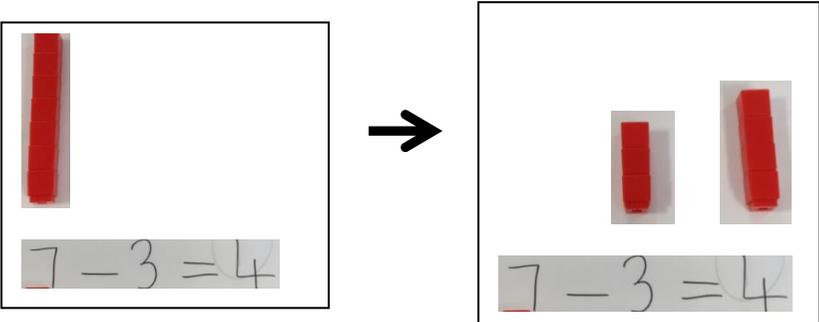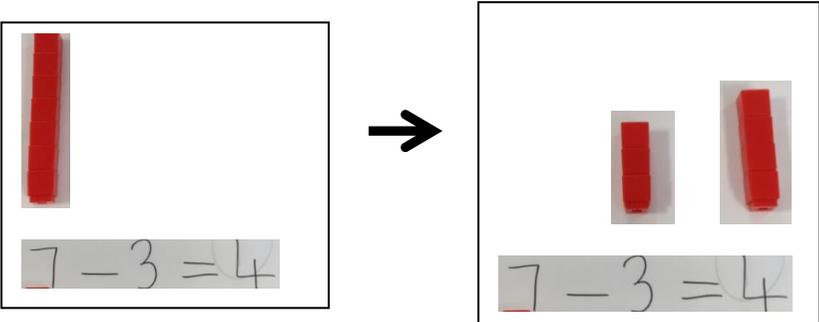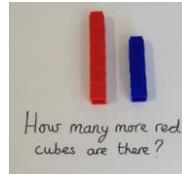ing trained to study the numbers before they start to decide on the most efficient method for working it out. The words in normal font are taken from the NC programme of study. The words in italics are guidance put together by the school to support teachers with the delivery of the policy.

Stage	addition	subtraction
1	*Ensure children:*	

Ensure children:

- *are able to subitise (up to six items) firstly in recognised patterns then moving to random arrangements*

- *realise than when the same amount is rearranged it is the same number and that an amount only changes its quantity when more is added or some is taken away*
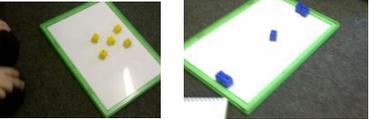
- *can respond appropriately to 'screened' amounts and they know when an amount is covered that it is still there*
- *can use their knowledge of one more/less to say what the total will be if an extra one is put on top of the 'screen' or if one is taken from the screened amount moving to two more/less*

Children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers (amounts) and count on or back to find the answer.
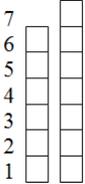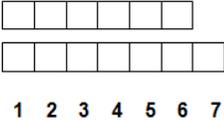
Using Unfix towers, or similar, compare amounts 'seven is one more than six so that means that six is one less than seven'

1 2 3 4 5 6 7

2	They should discuss and solve problems in familiar practical contexts, including using quantities. Problems should include the terms put together, add, altogether, total, take away, difference between, more than and less than so that pupils develop the concept of addition and subtraction and are enabled to use these operations flexibly.

read, write and interpret mathematical statements involving addition (+) and equals (=) signs (using numbers from 0 to 20) *Work on number facts i.e. bonds to make all numbers up to, and including, ten:* Solve one-step problems that involve addition, using concrete objects and pictorial representations, and missing number problems such as: *i.e. There are eight cups on the table. Put four more cups on the table. How many cups are on the table now? 8+4=?* *i.e. How many ways can you make 10 with two numbers? 10=?+?*	read, write and interpret mathematical statements involving subtraction (-) and equals (=) signs (using numbers from 0 to 20) *Understand the subtraction sign such as seven can be built with 3 and 4 so 7 subtract 3 is 4 and 7 subtract 4 is 3 (show this effect in stages:* Solve one-step problems that involve subtraction, using concrete objects and pictorial representations, and missing number problems. *i.e. There are fifteen cubes in this box. I am taking out three of the cubes. How many cubes are left in the box? 15-3=?* *i.e. There are seven bricks in the box. How many more bricks must we put in the box to make fifteen bricks altogether? 7+?=15* *i.e. There*

3	Solve problems with addition and subtraction: • using concrete objects and pictorial representations, including those involving numbers, quantities and measures • applying their increasing knowledge of mental and written methods • *include playing the 'swap shop' game with the base 10 resources to support with using them to understand addition and subtraction written methods in year 3* • *problems including difference/distance between i.e. more/less **than** such as with:*

*'How many more red cubes are there **than** blue cubes?'*

Ella wants to buy one banana.

banana **35p**

She has 20p.
How much more money does she need?

There are 4 fewer boys than girls in Mr Hill's class. There are 18 girls. How many boys are there in Mr Hill's class?

Recording addition and subtraction in columns supports place value and prepares for efficient written methods with larger numbers. *(To initially be modelled both horizontally and vertically by teacher then children to begin to write number sentences vertically for addition and subtraction as the year progresses)*

add numbers using concrete objects, pictorial representations, and mentally, including:	subtract numbers using concrete objects, pictorial representations, and mentally, including:
▢ a two-digit number and ones ▢ a two-digit number and tens ▢ two two-digit numbers ▢ adding three one-digit numbers *(for all, without needing to 'carry')*	▢ a two-digit number and ones ▢ a two-digit number and tens ▢ two two-digit numbers

add numbers using concrete objects, pictorial representations, and mentally, including:

▢ a two-digit number and ones
▢ a two-digit number and tens
▢ two two-digit numbers
▢ adding three one-digit numbers
(for all, without needing to 'carry')

24 + 5

35 + 10
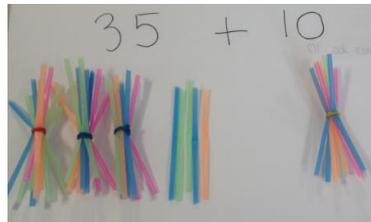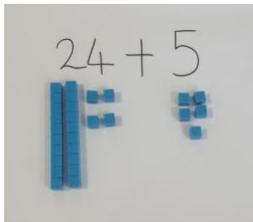
Moving to recording the larger number with just numerals and building the smaller amount only to use as a model to see what happens when counting on 'in your head'.

4 + 3 + 6 =
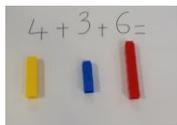
Encourage children to rearrange amounts to use knowledge of bonds.

There were 24 biscuits in a packet. Jack put 7 of the biscuits on a plate.

How many biscuits were left in the packet?

subtract numbers using concrete objects, pictorial representations, and mentally, including:

▢ a two-digit number and ones
▢ a two-digit number and tens
▢ two two-digit numbers

$27 - 5 = 22$ → $27 - 5 = 22$

$25 - 12 = 13$ → $25 - 12 = 13$
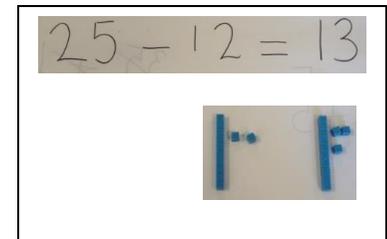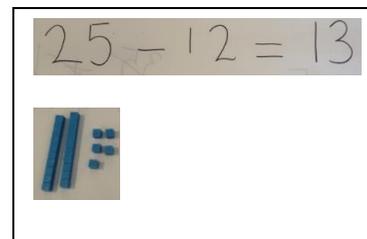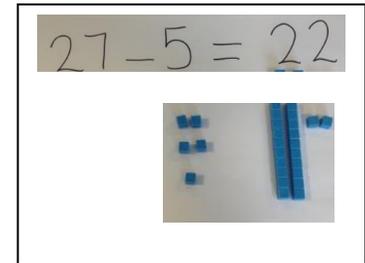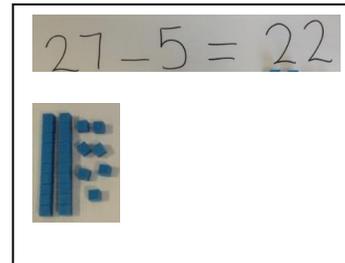
And in a variety of contexts i.e. using coins:

			Amy has these coins in her purse. How much is in Amy's purse? Amy spends 10p. How much does she have left?

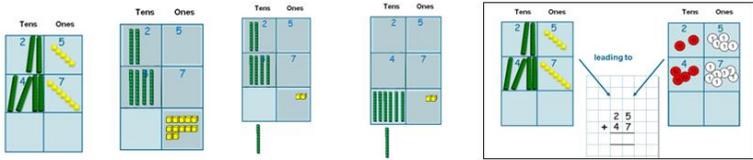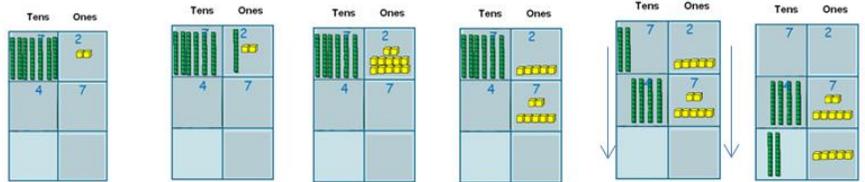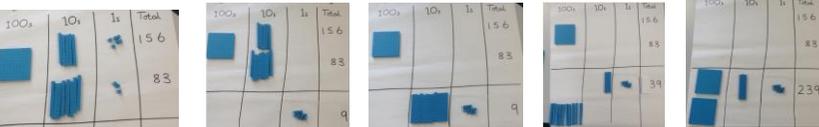| **4**	Pupils use their understanding of place value and partitioning, and practise using columnar addition and subtraction with increasingly large numbers up to three digits to become fluent.	
	Add numbers with up to three digits, using formal written method of columnar addition. *Use the NCETM models to support with understanding how to set it out:25+47* 	Subtract numbers with up to three digits, using formal written method of columnar subtraction. *Use the NCETM models to support with understanding how to set it out: 72-47*
E.G.s for written	156 + 83 use the base 10 equipment to model the process step by step: 256 + 172 Calculate 584 + 79 Calculate 369 + 251	Calculate 137 – 65 use the base 10 equipment to model the process step by step: Calculate 438 – 296
E.G.s for mental	*200 + 35 (as can be done mentally using knowledge of recombining)* *Base 10 resources are good for children to conceptually understand this (and the clue is in the name: 'one hundred plus thirty-five is one hundred **and** thirty-five.'):*	*100 – 37 (as can be done mentally using knowledge of complements of 100)* *Bead strings are a good model to use to see the effect of complements of numbers to 100 where there is value in the Units i.e. because 37+63=100 then 100-37=63 etc:*

5	Pupils continue to practise both mental methods and columnar addition and subtraction with increasingly large numbers to aid fluency.	
	Add numbers with up to 4 digits using the formal written method of columnar addition where appropriate.	Subtract numbers with up to 4 digits using the efficient written method of columnar subtraction where appropriate.
E.G.s for written	*3 517+396:* *(Be aware that some children may be able to find the answer to the above example by adding 400 to 3517 and then adjusting by subtracting 4 in their head.)*	*2 754 – 1 562:*
E.G.s for mental	*3000 + 567* *3472 + 1111* *3456 + 1000* *5634 + 100* *6743 + 10 (as all of these can be done mentally referring to place value)*	*1000 – 132 (this can be done mentally using complements of 100)* *2000 – 5 (this can be done by counting back the small number and/or using bonds of 10)*
6	Pupils practise using the formal written methods of columnar addition and subtraction with increasingly large numbers to aid fluency. *This includes decimal numbers. (Pupils continue to use mental methods when the numbers allow for this.)*	
	Add whole numbers with more than 4 digits, including using formal written methods (columnar addition).	Subtract whole numbers with more than 4 digits, including using formal written methods (columnar subtraction).
E.G.s for written	*Adding several numbers using a written method:*	*Example for layout of subtraction using decomposition:*

$$
\begin{array}{r}
8\,1{,}0\,5\,9 \\
3{,}6\,6\,8 \\
1\,5{,}3\,0\,1 \\
+\ 2\,0{,}5\,5\,1 \\
\hline
1\,2\,0{,}5\,7\,9 \\
\end{array}
$$

Other examples (which do not require 'carrying'):

63 141 + 3 756 becomes:

$$
\begin{array}{r}
6\,3\,1\,4\,1 \\
+\ 3\,7\,5\,6 \\
\hline
6\,6\,8\,9\,7 \\
\end{array}
$$

Including decimal numbers:

For example: 56.39 + 18.61

Line up the decimals like this:

$$
\begin{array}{r}
5\,6{.}3\,9 \\
+\ 1\,8{.}6\,1 \\
\end{array}
$$

Then just add the numbers like normal:

$$
\begin{array}{r}
5\,6{.}3\,9 \\
+\ 1\,8{.}6\,1 \\
\hline
7\,5{.}0\,0 \\
\end{array}
$$

(which do require 'carrying'):

27 424 + 9 694 becomes:

$$
\begin{array}{r}
2\,7\,4\,2\,4 \\
+\ 9\,6\,9\,4 \\
\hline
3\,7\,1\,1\,8 \\
\end{array}
$$

$$
\begin{array}{r}
3\,1\,0\,4 \\
\cancel{5}\ \cancel{X}\ {,}0\ \cancel{5}\ \cancel{6} \\
-\ 2\,1\,2\,8 \\
\hline
2\,8{,}9\,2\,8 \\
\end{array}
$$

Including decimal numbers:

Line up the decimal points	Line up the decimal points
76.3	4.321
- 34.1	- 4.1
42.2	0.221

Other examples:
Including measures such as 9.07km – 1 496m
Including money such as £127.17 - £74.86

	Including measures such as 1.32km + 973m *Include money such as £17.17 + £14.86*	
E.G.s for mental	What is the sum of eight point five and eight point six? Add together nought point two, nought point four and nought point six. *Mental questions including fractions:* Add together two and a half and three and a half and four and a half. *Mental questions including more than one operation i.e.:* Two metres of wire cost ninety pence. How much will three metres of wire cost?	Subtract one point nine from two point seven. Subtract nought point one from two. What is thirty-one point nine subtract twenty-one point four? Calculate ten minus four point three five.
| **Formal written method** | 789 + 642 becomes<br><br>```
    7  8  9
 +  6  4  2
 _____
 1  4  3  1
    1  1
```<br>Answer: 1431 | 874 – 523 becomes<br><br>```
   8  7  4
 − 5  2  3
 _____
   3  5  1
```<br>Answer: 351<br><br>932 – 457 becomes<br><br>```
   8  12  1
   9  3  2
 − 4  5  7
 _____
   4  7  5
```<br>Answer: 475 |