West Jesmond Calculation Policy Yr 1-Yr 6: Addition

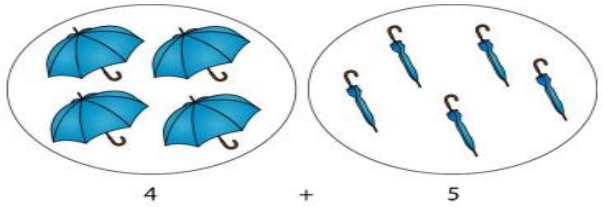
Progression In Written Addition Methods

Year 1	Models & Examples

The Addition Symbol

Children are introduced to the addition symbol (+) for the first time. They combine this with the 'equal to' symbol (=) to create their first number sentences e.g. 3+2=5.

At this stage, children focus on a specific order to the numbers sentence (a+b=c)



4 + 5

- *'There are four open umbrellas and five closed umbrellas.'*
- *'We can write this as four plus five.'*

4 + 5

- *'The 4 represents the four open umbrellas.'*
- *'The 5 represents the five closed umbrellas.'*

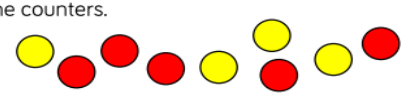
Two parts clearly grouped – scaffolded:

3 + 2

'There are three full glasses and two empty glasses. We can write this as three plus two.'

3 + 2

Here are some counters.

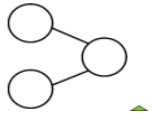


Group the counters by colour.
Fill in the gaps in the sentence and say it out loud.

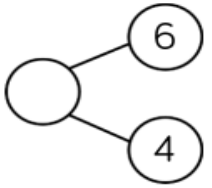
_____ red counters plus _____ yellow counters is equal to _____ counters.

Complete the part-whole model and the number sentence.

□ + □ = □

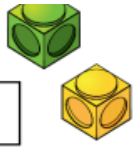


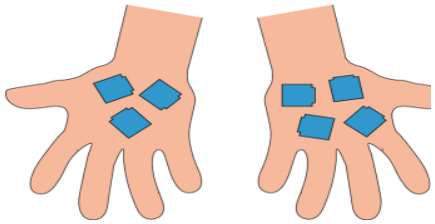
Use cubes to solve the following calculations.



5 + 3 = □

8 + 1 = □

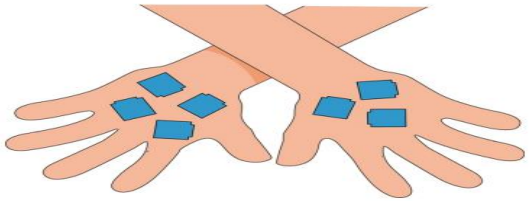




'There are three cubes in this hand.' 'There are four cubes in this hand.'

'We can write this as three plus four.'

3 + 4



'There are four cubes in this hand.' 'There are three cubes in this hand.'

'We can write this as four plus three.'

4 + 3

Fact Families – Addition Facts

Children build on initial number sentences by looking at addition fact families. They can see that the order of an addition sentence can be varied, and they begin to discover that addition is commutative.

E.g. $3 + 2 = 5$ $2 + 3 = 5$

$5 = 3 + 2$ $5 = 2 + 3$

Number Bonds within 10

Children combine their knowledge of the part-whole model and addition facts to explore number bonds within 10. Starting with the whole, children break numbers into parts and explore how many different ways a number can be partitioned.

E.g. $5 = 3 + 2$

$5 = 4 + 1$

Complete the number sentences.

___ + ___ = 7 7 = ___ + ___

___ + ___ = 7 7 = ___ + ___

Here are 5 cubes.

Break them apart in different ways to find all the number bonds to 5

One has been done for you.

$5 = 3 + 2$

Systematic Number Bonds

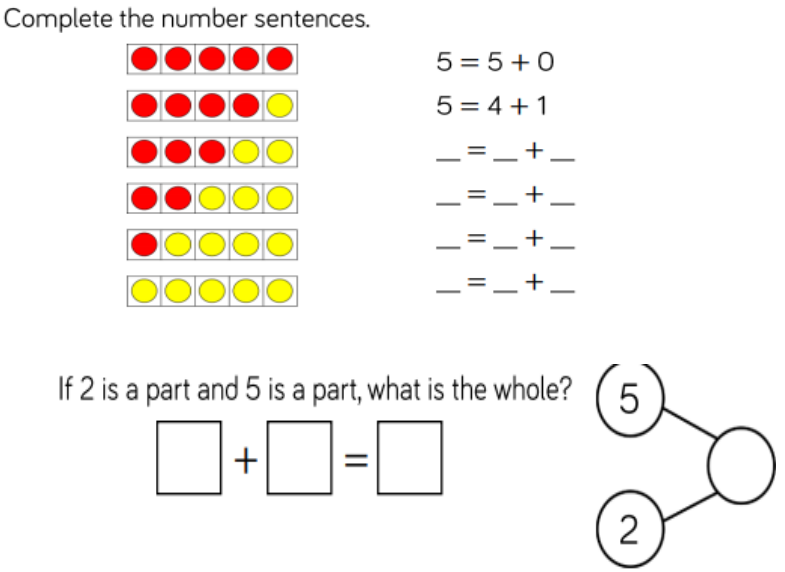
Children apply their partitioning skills to work systematically starting with the whole. E.g.

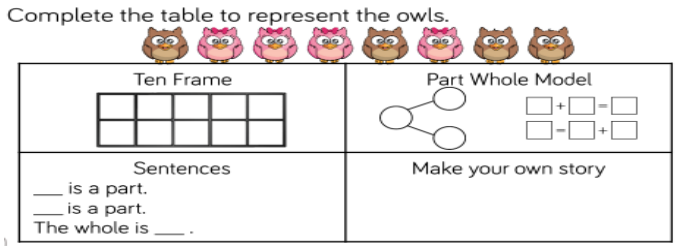
7+0=7
6+1=7
5+2=7
4+3=7

Add Together

Children will use a part-whole model to understand the concept of addition. They should be accurately using the '+' and '=' symbols.

Children should also become familiar with language related to addition such as 'total' and 'altogether.'



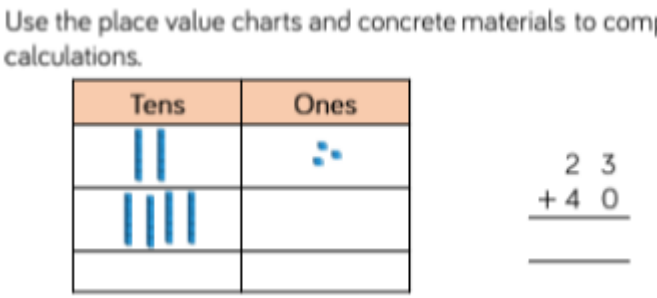


Year 2

Models & Examples

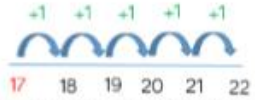
Add and Subtract 10s

Children should make use of place value to add 10s from a given number within 100.



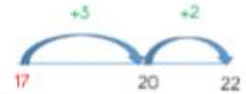
Add 2-digits and 1-digit

17 + 5 =

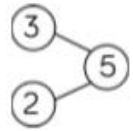


Can you put the larger number in your head and count on the smaller number? Start at 17 and count on 5

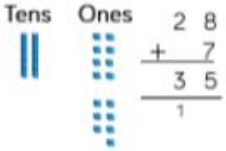
Can we use number bonds to solve the additionmore efficiently?



We can partition 5 into 3 and 2 and use this to bridge the 10



Find the total of 28 and 7



- Partition both the numbers.
- Add together the ones.
- Have we got 10 ones?
- Exchange 10 ones for 1 ten.
- How many ones do we have?
- How many tens do we have?

Add 2-digit Numbers (1)

Focus on the language of tens and ones and look at different methods to add the numbers including the column method.

Find the sum of 34 and 23

64 + 12 = ____

4 ones + 2 ones = ____

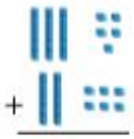
6 tens + 1 ten = ____

____ tens + ____ ones = ____

Add 2-digit Numbers (2)

Children use Base 10 and partitioning to add together 2-digit numbers including an exchange.

Find the sum of 35 and 26



- Partition both the numbers.
- Add together the ones. Have we got 10 ones?
- Exchange 10 ones for 1 ten.
- How many ones do we have?
- Add together the tens. How many do we have altogether?

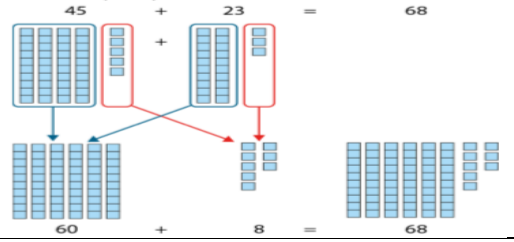
'What is the total cost of the bike and the construction set?'

Comparing calculations:

£40 + £5 + £20 + £3	£45 + £23

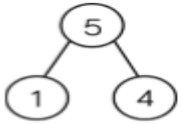
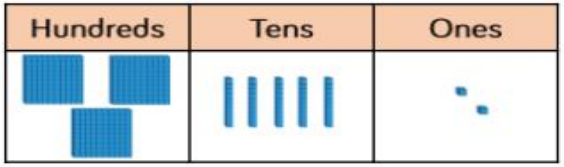
- *'What's the same?'*
- *'What's different?'*

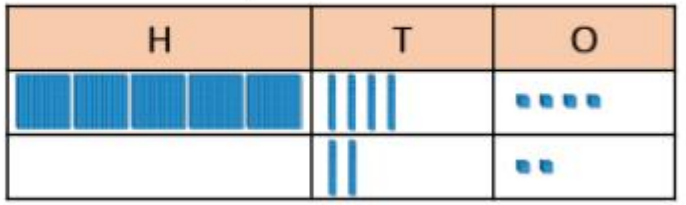
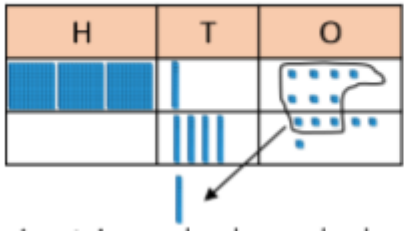
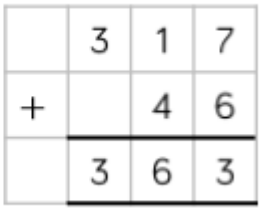
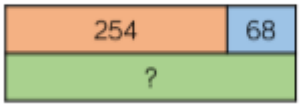
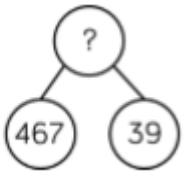
Dienes and part–part–whole model:



68	
45	23

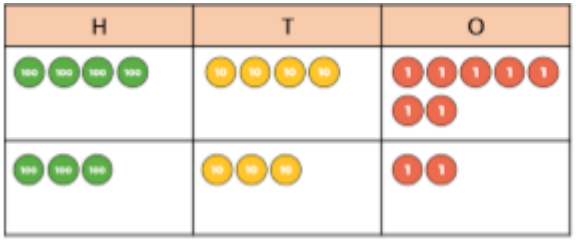
so £45 + £23 = £68

Year 3	Models & Examples
Add 3-digit and 1-digit Numbers. Children add ones to a 3-digit number, with an exchange. They discover that when adding ones it can affect the ones column and the tens column. Children learn that we can only hold single digits in each column, anything over must be exchanged. The use of 0 e.g. 145-5 is important so they know to use zero as a place holder.	We can use Base 10 to solve 245 + 7  We can use a number line to calculate 346 + 7  46 + 4 = 50 50 + 3 = 53 so 346 + 7 = 353 We can partition our 1-digit number to calculate 379 + 5  379 + 1 = 380 380 + 4 = 384
3-digit and 2-digit Numbers Children look at what happens to a 3-digit number when a multiple of 10 is added. Different representations such as Base 10, arrow cards and place value charts should be used. Children should explore whether a column method is needed and explain why. Mental methods should be encouraged throughout. Children add multiples of 10, to a 3-digit number with an exchange. Encourage children to count in 10s rather than use column addition.	 Use place value counters to complete the number sentences. 352 + 4 tens = ____ 352 − 2 tens = ____ Complete the bar models.  What do you notice?

Add & Subtract 100s. Children can build on their knowledge of adding 100s together e.g. 300 + 500, by adding ones and tens to solve calculations such as 234+500. It is important to develop flexibility and ask the children why the column method isn't always the most effective method.	
2-digit & 3-digit Numbers Children focus on the position of numbers and place value to add and subtract 2-digit and 3-digit numbers. They represent numbers using Base 10 and line up the place value columns. In this step, children add numbers without an exchange.	Match the calculation to the correct representation and solve. 26 + 461 
Add 2-digit & 3-digit Numbers Children deepen their understanding of adding 2-digit and 3-digit numbers in this step. They start adding numbers where there is an exchange from ones to tens, they then move on to exchanging tens to hundreds before adding numbers where there are exchanges in both columns. The links between concrete representations and the column method should be highlighted in order to support children's' understanding.	Annie uses Base 10 to calculate 317 + 46    Complete the models using column addition.   

Adding Two 3-digit Numbers.

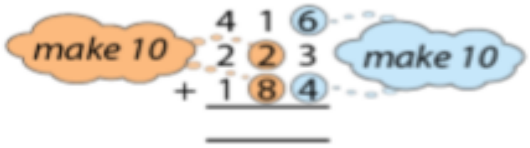
Children add two 3-digit numbers with no exchange. They should focus on the lining up of the digit and setting the additions clearly out in columns. Reinforce that we only exchange when there are 10 or more in a column.



___ + ___ = ___

$$\begin{array}{r} 223 \\ +\ 114 \\ \hline 337 \end{array}$$

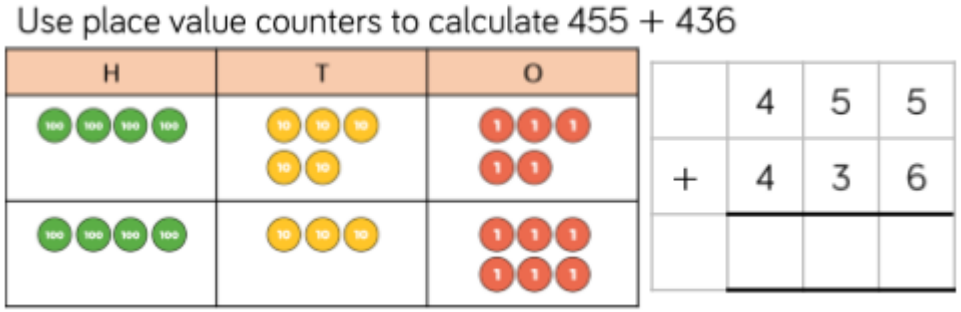
Add the ones first, then the tens, then the hundreds.

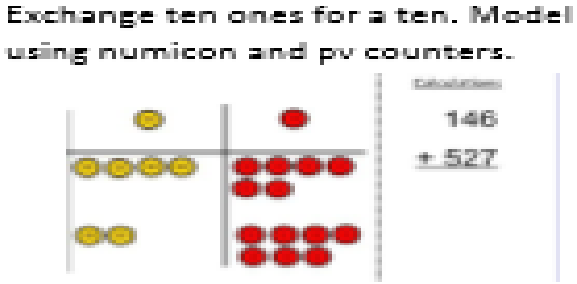


Adding Two 3-digit Numbers with an exchange.

Children add two 3- digit numbers with an exchange. They start by adding numbers where there is one exchange required before looking at questions where they need to exchange in different columns. Children may use Base 10 or place value counters to model their understanding.

Add up the ones and exchange 10 ones for one 10.





Year 4

Models & Examples

1s,10s,100s,1,000s

Children build on prior learning of adding hundreds, tens and ones. They are introduced to adding thousands.

The number being represented is ____.

Add 3 thousands to the number. What do you have now?

Add 3 hundreds to the number. What do you have now?

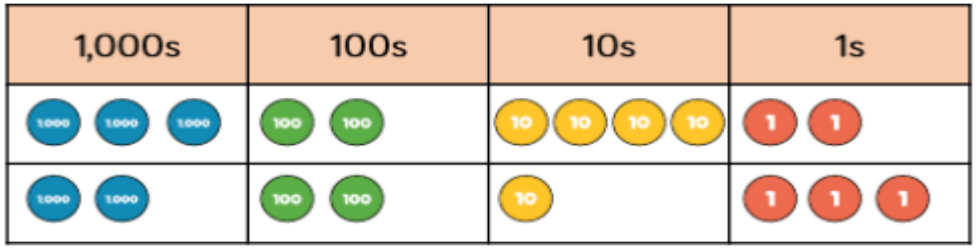
Subtract 3 tens from the number. What do you have now?

Add 5 ones to the number. What do you have now?

Adding Two 4-digit Numbers (1)

Children use their understanding of addition of 3-digit numbers to add two 4-digit numbers with no exchange. They use concrete equipment and a place value grid to support their understanding alongside column addition.

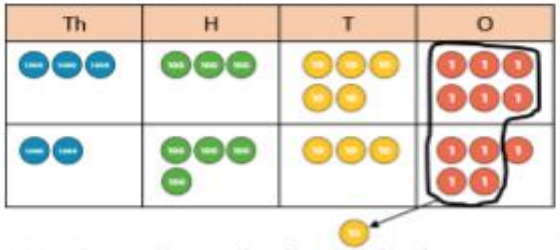
Use counters and a place value grid to calculate 3,242 + 2,213



Add two 4-digit Numbers (2)

Children add two 4-digit numbers with one exchange. They use a place value grid to support understanding alongside column addition. They explore exchanges as they occur in different place value columns and look for similarities/differences.

Rosie uses counters to find the total of 3,356 and 2,435

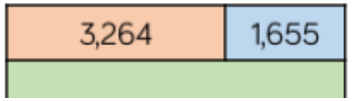


	Th	H	T	O
	3	3	5	6
+	2	4	3	5
	5	7	9	1
			1	

Use Rosie's method to calculate:

3,356 + 2,437 3,356 + 2,473 3,356 + 2,743

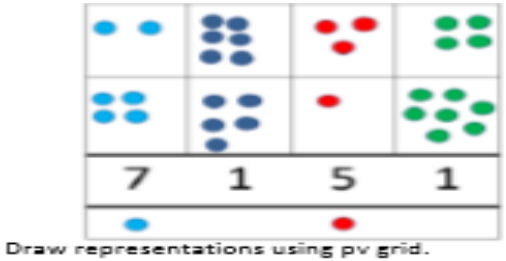
Complete the bar models.



Add two 4-digit Numbers (3)

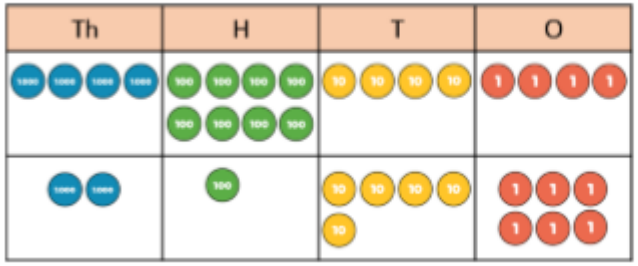
Building on adding two 4-digit numbers with one exchange, children explore multiple exchanges within an addition.

Ensure children continue to use equipment alongside the written method to help secure understanding of why exchanges take place and how we record them.



Draw representations using pv grid.

Find the total of 4,844 and 2,156

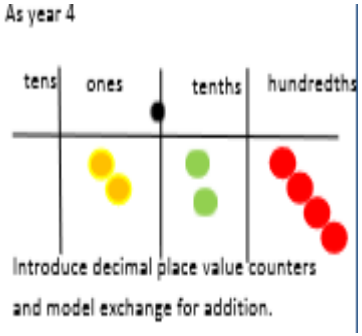
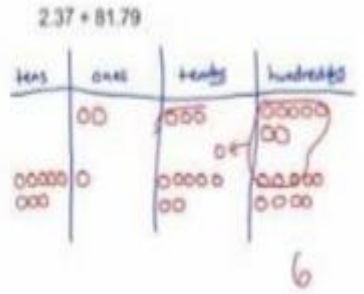


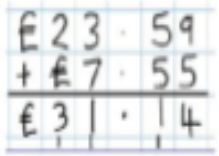
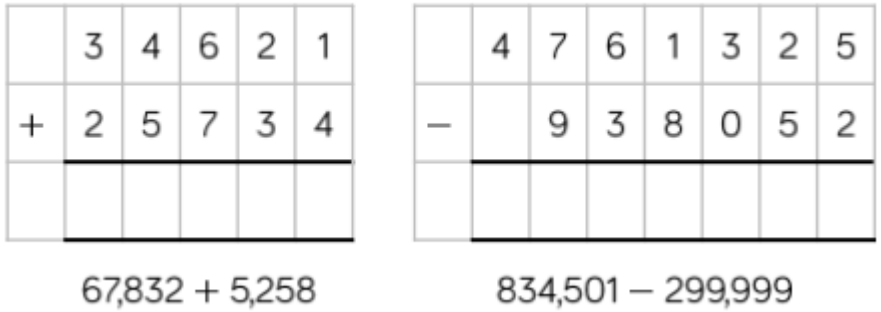
	4	8	4	4
+	2	1	5	6

Column additions:

$$\begin{array}{r} 6,584 \\ +\ 2,739 \\ \hline 9,323 \\ \scriptstyle 1\ \ 1\ \ 1 \end{array}$$

$$\begin{array}{r} 2,373 \\ 6,058 \\ +\ 1,541 \\ \hline 9,972 \\ \scriptstyle \ \ 1\ \ 1 \end{array}$$

Year 5	Models & Examples
Add More than 4-digits Children will build upon previous learning of column addition. They will now look at numbers with more than four digits and use their place value knowledge to line the numbers up accurately. Children use a range of manipulatives to demonstrate their understanding and use of pictorial representations to support their problem solving.	Ron uses place value counters to calculate 4,356 + 2,435  Use Ron's method to calculate: Th H T O 4 3 5 6 + 2 4 3 5 6 7 9 1 1 3 2 4 6 1 + 4 3 5 2 4 8 2 7 6 + 5 6 1 3
Add decimals to two decimal places, including money.	
Children to record exchanges with decimal place value counters to reinforce understanding.	

Moving to the abstract when tackling problems related to money or measures.	72.8 +54.6 127.4 1 1 
Year 6	**Models & Examples**
Adding Integers Children consolidate their knowledge of column addition, reinforcing the language of 'exchange.' After showing confidence with smaller numbers, children should progress to multi-digit calculations. Children will consider whether the column method is always appropriate e.g. when adding 999, it is easier to add 1,000 then subtract 1. **Add several numbers of increasing complexity.** Aim for both conceptual and procedural fluency with columnar method secured.	Calculate. 

Add money, measures and decimals with different numbers of decimal points.