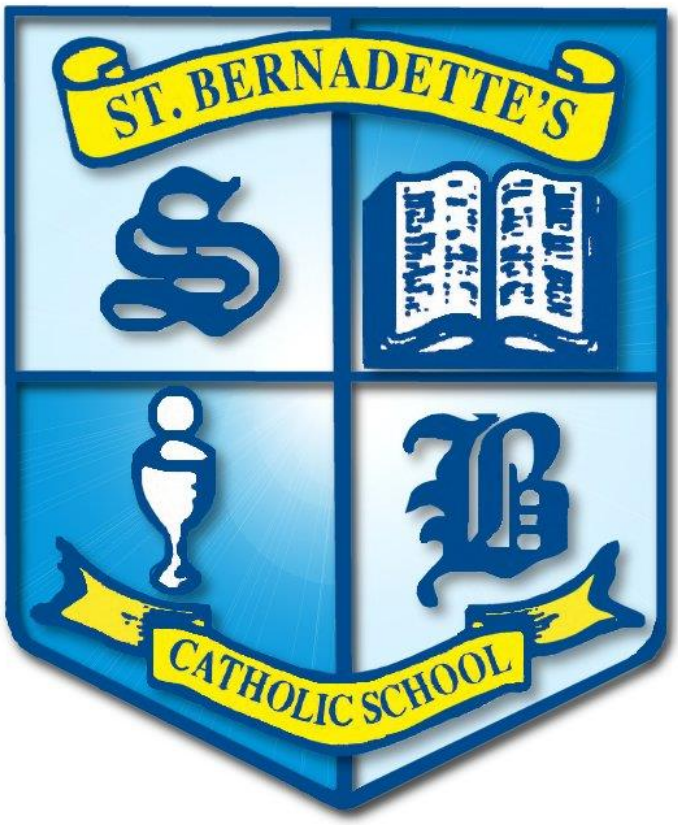
St Bernadette's Catholic Primary School



Stage 1 - 6 Calculations Policy for Addition

2015-2016

Addition – Stage 1

Mental and Written Strategies

Combining groups of objects

Joining two groups and then recounting all objects using one-to-one correspondence

3 + 4 = 7

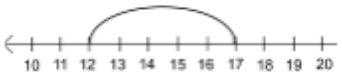
5 + 3 =8

Counting on

Single digit number from a single digit number.
Single digit number from a 2-digit number.

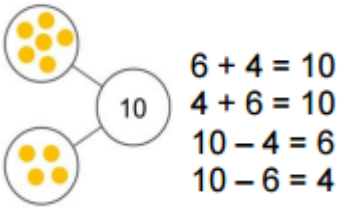
8 + 1 = 9

17 = 12 + 5



Part whole

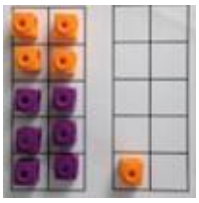
This teaches addition and subtraction alongside each other, as the children will use the model to identify the link between addition and subtraction.



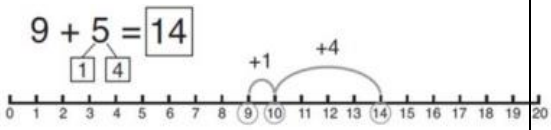
Make ten

Teach children to start at the bigger number and use the smaller number to make ten.

6 + 5 = 11



9 + 5 = 14



9 + 4 = 13

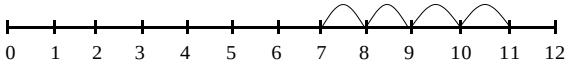
Numicon

3 + 4 is the same as 7 as modelled using Numicon

Number lines and hundred squares

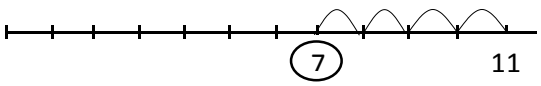
Counting forwards on a number line
Recording by - drawing jumps on prepared lines

7 + 4



Teacher model number lines with missing numbers

7 + 4 = 11



Secure Stage 1 – able to use a hundred square

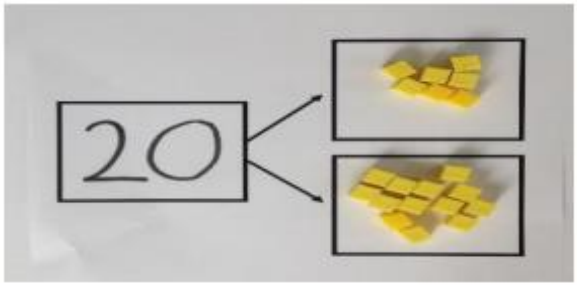
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40

Addition – Stage 2

Mental Strategies

Part whole

This teaches addition and subtraction alongside each other, as the children will use the model to identify the link between addition and subtraction.



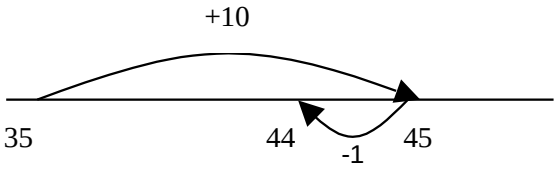
□ + □ = 20 20 − □ = □

□ + □ = 20 20 − □ = □

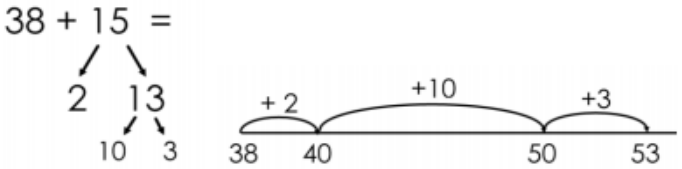
Add 9 or 11

Add 9 or 11 by adding 10 and adjusting by 1

35 + 9 = 44



Bridging through ten



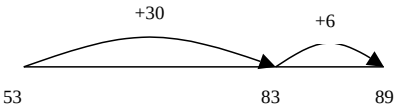
Written Strategies

Number lines

22 + 17=

First adding the tens and then adding the ones

or



Expanded method

Place value grids and Dienes blocks should be used as shown in the diagram before moving onto the pictorial representations. Dienes blocks should always be available, as the main focus is the concept of place value.

36 + 43 = 79

Partition both numbers

$$\begin{aligned} 36 &= 30 + 6 \\ 43 &= 40 + 3 \\ \hline 79 &= 70 + 9 \end{aligned}$$

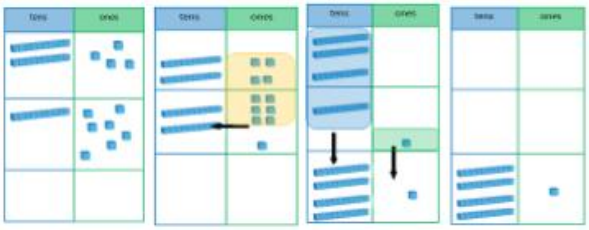
Recombine to get the answer

30 + 40 6 + 3

No regrouping

24 + 13 =

With regrouping - 24 + 17 =



Addition – Stage 3

Mental Strategies

Add a three digit number and ones, a three-digit number and tens, a three digit-number and hundreds and all two-digit numbers using an efficient mental strategy.

Common mental calculation strategies

- Partitioning and recombining
- Doubles and near doubles
- Use number pairs to 10 and 100
- Adding a near multiple of ten and adjusting
- Using patterns of similar calculations
- Using known number facts
- Bridging through the tens and hundred

Written Strategies

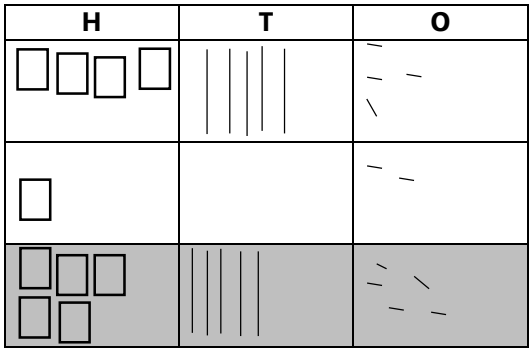
Formal columnar methods of addition

Dienes blocks or **place value counters** should be used alongside the pictorial representations; they can be placed on the place value grid before pupils make pictorial representations.

Pictorial representations

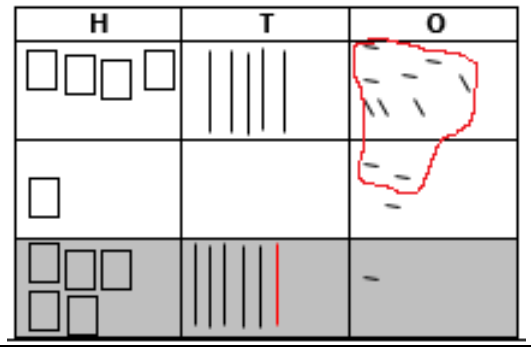
(Without regrouping)

454 + 102 =



(With regrouping)

458 + 103 =



Expanded addition

The expanded method should be taught alongside column addition to see how they relate.

253 + 136 = 389

200 + 50 + 3

100 + 30 + 6

300 + 80 + 9 =389

Column addition

$$\begin{array}{r} 358 \\ +\ 73 \\ \hline 431 \\ {\scriptstyle 1\,1} \end{array}$$

Addition – Stage 4

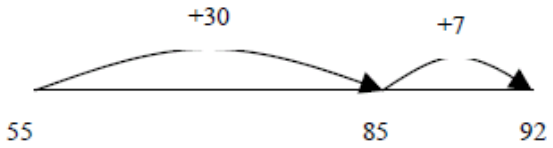
Mental Strategies

Informal methods to support Mental calculations.

- Practise mental methods with increasingly large numbers.
- Consolidate partitioning and repartitioning

55+37=55+30+7
=85+7
=92

- Use compensation for adding too much/little and adjusting
- Use straws, Dienes, place value counters, empty number lines etc.



Common mental calculation strategies:

- Partitioning and recombining
- Doubles and near doubles
- Use number pairs to 10 and 100
- Adding near multiples of ten and adjusting
- Using patterns of similar calculations
- Using known number facts
- Bridging though ten, hundred
- Complementary addition

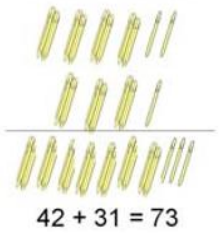
Written Strategies

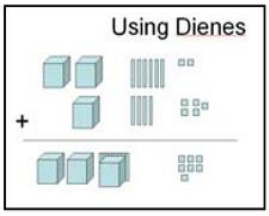
Use physical/pictorial representations alongside expanded and columnar methods.

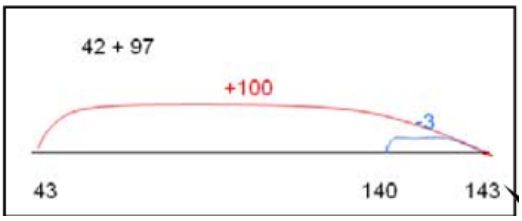
-Add numbers with up to four digits, using the formal written (columnar) method
-Add three digit numbers using columnar method and then move onto 4digits.
-Include decimal addition for money

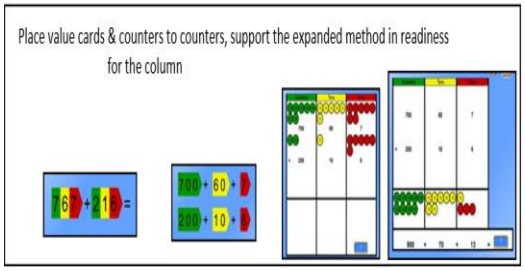
Pictorial representations:

Bundles of straws





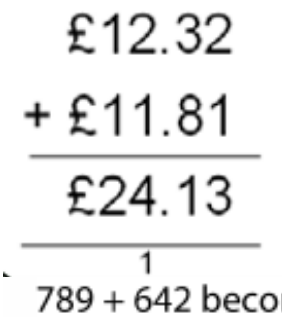




Expanded column addition as in Stage 3

Progress onto column addition

N.B. Revert to expanded methods if children find formal calculation method difficult



789 + 642 becomes

	7	8	9
+	6	4	2
1	4	3	1
	1	1	

Answer: 1431

Understanding calculation	**Extends onto:**	**Missing Numbers** Continue using a range of equations as in Stage 3 but with appropriate, larger numbers. Use inverse operations to find missing numbers, including decimals (e.g. 0.63 + ? =1 and 4.5 + ? = 10 and 'undo' two-step problems e.g. I'm thinking of a number, I add 13.4 and then subtract 6.7 and my answer is 43.2. What was my number? **Balancing Equations and Brackets** Understand 'balancing equations' such as 8.3 + 7.4 = ? – 4.3 Understand the use of brackets in simple calculations: e.g. (7x8)+10=66

Addition – Stage 5

Mental Strategies

- Add numbers mentally with increasingly large numbers, e.g. 12,462+2300=14762
- Mentally add tenths, and one digit numbers and tenths
- Add decimals, including a mix of whole numbers and decimals,
- Decimals with different numbers. Of places, and complements of 1 (e.g.0.83+0.17=1)

Common mental calculation strategies:

- Partitioning and recombining
- Doubles and near doubles
- Use number pairs to 10 and 100
- Adding near multiples of ten and adjusting
- Using patterns of similar calculations
- Using known number facts
- Bridging though ten, hundred, tenth
- Complementary addition.

Written Strategies

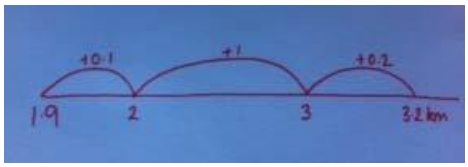
Formal methods

Children use representation of choice Refer back to pictorial and physical representations when needed.

Representations to support mental and written calculations.

Use physical/pictorial representations alongside columnar methods where needed.

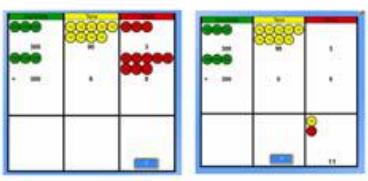
Jottings to support mental calculations



Partitioning to recombine

12 462 + 2300
= 12 462 + 2000 + 300
= 14 462 + 300
= 14 762

Place Value counters to support column addition



393
+ 308
1
1

Add whole numbers with more than four digits, using the formal written (columnar) method

1247.97 + 3416.248 = 4664.218

1247.97
+3416.248
4664.218
1 1 1

Add three digit numbers using columnar method and then move onto 4 digits.
Include decimal addition for money.

£563.14
+ £207.88
£771.02
1 1 1

Understanding calculations	**Extend onto:**	**Missing Numbers** Continue using a range of equations as in Stage 3 and 4 but with larger numbers and decimal numbers. **Balancing Equations and Brackets** Continue using a range of balancing equations as in Stage 3 and 4 but with larger numbers and decimal numbers. Begin to know the order of operations (early BIDMAS) including use of brackets: e.g. 3 x (140 +5) – (3^2) = **Algebra** Use mental and written strategies for addition to generate and solve algebraic equations.

Addition – Stage 6

<table>
<tr><td></td><td colspan="3">Addition – Stage 6</td></tr>
<tr><td>Mental Strategies</td><td>-Perform mental calculations, including with mixed operations and large numbers (more complex calculations)</td><td colspan="2">Children use representation of choice
Consolidate partitioning and repartitioning.
Use compensation for adding too much/little and adjusting
Refer back to pictorial and physical representations when needed.

Common mental calculation strategies:
Partitioning and recombining
Doubles and near doubles
Use number pairs to 10 and 100
Adding near multiples of ten and adjusting
Using patterns of similar calculations
Using known number facts
Bridging though ten, hundred, tenth
Complementary addition</td></tr>
<tr><td>Written Strategies</td><td>-Add larger numbers using the formal written (columnar) method.
-Add three digit numbers using columnar method and then move onto 4 digits.
-Include decimal addition for money</td><td>Pictorial representations:

As seen in Stage 4 and 5

Children should be able to choose resources/ representations of their own choice.</td><td><u>Written Methods</u>
Use the compact method as shown in Stages 4 and 5 with increasingly larger numbers.

e.g. 546,789+325,664=

£3,456.21+£4,346.37=</td></tr>
<tr><td>Understanding calculations</td><td>Extend onto</td><td colspan="2"><u>Missing Numbers</u>
Continue using a range of equations as in Stage 4 and 5. Include challenging whole numbers and decimal numbers and mixed operations.

<u>Balancing Equations and Brackets</u>
Continue using a range of balancing equations as in Stage 4 and 5. Include challenging whole numbers and decimal numbers and mixed operations.

<u>Algebra</u>
Use mental and written strategies for addition to generate and solve algebraic equations.</td></tr>
</table>