Shilbottle Primary

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Addition policy

- Year group examples
- Vocabulary
- Micro steps
- Year group expectations

Addition Year 1

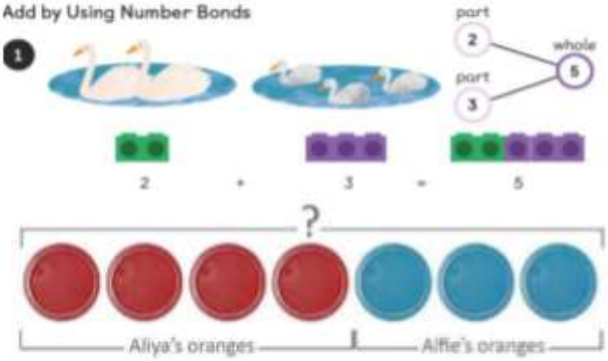
CPA Approach
(Concrete, Pictorial, Abstract)

Counting and Combining sets of Objects to 20

Combining two sets of objects e.g. Numicon, bundles
of straws, Dienes apparatus, multi-link cubes, bead strings, ten frames, etc, which will progress onto adding on to a set.

Understanding of counting using knowledge of number bonds

Ensure that children understand the breaking up of a
calculation. 2+3=5 Represented using concrete linking
to pictorial

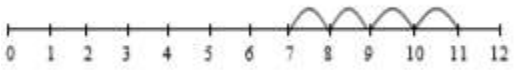


From here move onto a bar model format so the children are used to grouping amounts together.

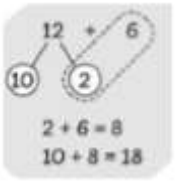
Understanding of counting on

(Supported by models and images).
7+ 4

If appropriate, progress from using number lines with
every number shown to number lines with significant
numbers shown. For example a number line that starts
at 20 and finishes at 30

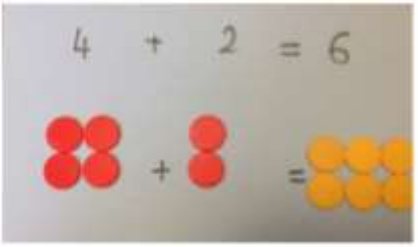


Children should be able to separate 2 digit numbers to
add the ones then add the tens.



+ = signs and missing numbers

Children need to understand the concept of equality
before using the '=' sign. Calculations should be written either side of the equality sign so that the sign
is not just interpreted as 'the answer'.
2 = 1+ 1
2 + 3 = 4 + 1
This would be modelled well using resources to show
that both sides are balanced



Vocabulary

Add, Addition ,Total, Equal, Group, Calculation, Plus, Together

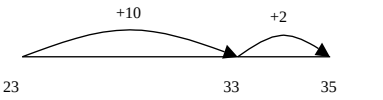
Addition Year 2

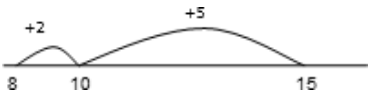
CPA Approach
(Concrete, Pictorial, Abstract)

It is valuable to use a range of representations (also see Y1). Continue to use objects , number lines and ten frames to develop understanding of commutative law and of:

Counting on in tens and ones

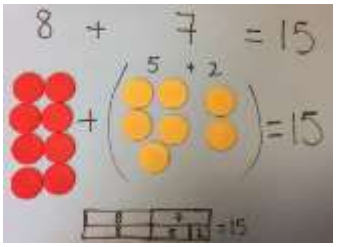
23 + 12 = 23 + 10 + 2
= 33 + 2
= 35





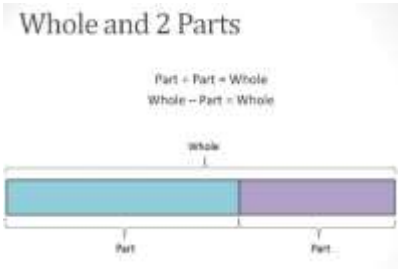
Partitioning and bridging through 10.

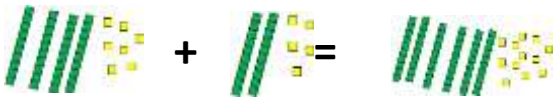
The steps in addition often bridge through a multiple of 10
E.g. Children should be able to partition the 7 to relate adding the 2 and then the 5.
8 + 7 = 15 (8+2+5=15) Use Cube



Bar Modelling

Use of two parts making one whole through bar modelling. This can be shown using cubes as well as drawn.
This will support your pictorial element

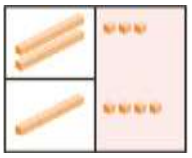


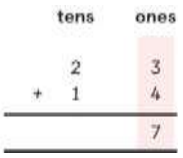


Towards a Written Method

Partitioning in different ways and recombine to 100

Leading towards Exchanging





Standard column method:

Concrete and pictorial to support the teaching of this method. Use of resources a necessity

Missing number problems

14 + 5 = 10 + Δ 32 + Δ + Δ = 100 35 = 1 + Δ+ 5

Vocabulary

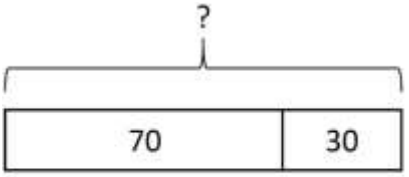
Add, Addition ,Total, Equal, Group, Calculation, altogether

Addition Year 3

CPA Approach
(Concrete, Pictorial, Abstract)

Bar Modelling

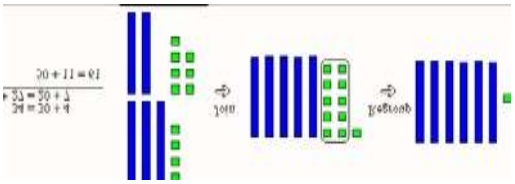
Bar Model approaches which will be continually referred to throughout the year to support the visual pictorial stage.
Children need to be secure adding multiples of 100 and 10 to any three-digit number including those that are not multiples of 10.



70 + 30 = 100

Base 10

Use of Base ten to support concrete and pictorial



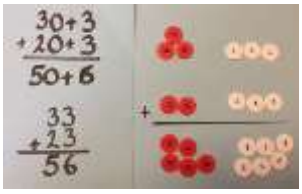
Partition into tens and ones

Partition both numbers and recombine.
Count on by partitioning the second number only e.g.

247 + 125 = 247 + 100 + 20+ 5
= 347 + 20 + 5
= 367 + 5
= 372

Towards a Written Method to 1000

Standard column addition can be modelled with place value counters, objects and pictorial representations



Leading to children understanding the renaming between tens and ones (carrying/exchanging).

	h	t	o
			8
+	2	3	6
		1	4
		3	0
+	2	0	0
	2	4	4

Include the Bar Method (See Above).
Missing number problems using a range of equations as in Year 1 and 2 but with appropriate, larger numbers

	h	t	o
	2	1 3	6
+	3	4	5
	5	8	1

Vocabulary

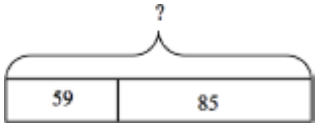
Addend, Total, Sum, Partition, increase, altogether

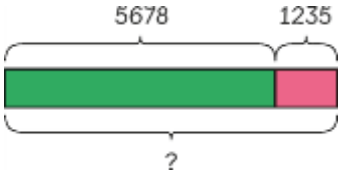
Addition Year 4

CPA Approach
(Concrete, Pictorial, Abstract)

Mental methods (within 10,000)

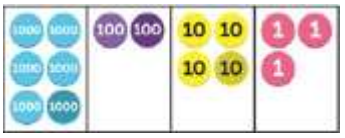
This can be taught alongside methods such as Bar Modelling so that the children have a visual representation

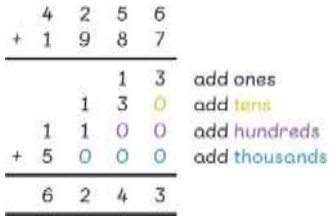




Written methods (progressing to 4-digits & 1dp)

Continue to model column addition with place value counters, objects, pictorial representations and the Bar Method
Ensure in the early stages you support as much as possible using resources to support calculations.

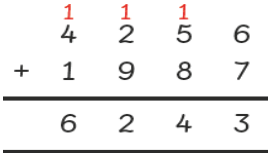




Regrouping

Extend to numbers with at least four digits, including renaming between various columns (Regrouping).

Select and use different methods to solve word problems, involving two step problems in context



Vocabulary

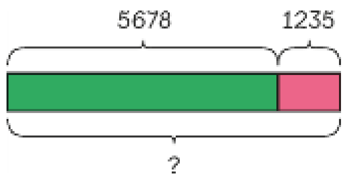
Addend, Total, Sum, Partition, increase, altogether

Addition Year 5

CPA Approach
(Concrete, Pictorial, Abstract)

Mental methods (within 1,000,000

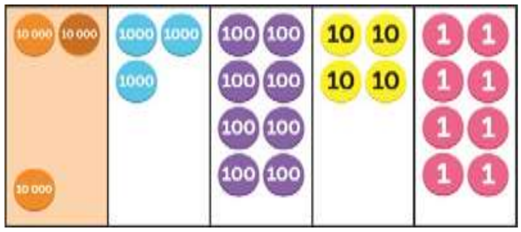
Develop, supported by a range of models and images, including place value counters. Children should practise with increasingly large numbers to aid fluency



12462 + 2300 = 14762

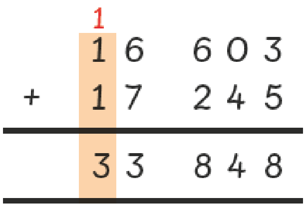
Written methods (progressing to more than 4-digits & 2dp)

As in Year 4, continue to explore column addition modelled with place value counters, objects, pictorial representations and the Bar Method



Column Additions

Children will move on to the formal columnar method for whole numbers and decimal numbers as an efficient written method.



Select and use different methods to solve word problems, involving two step problems in context. Use of Bar Model alongside calculations for word problems.

Vocabulary

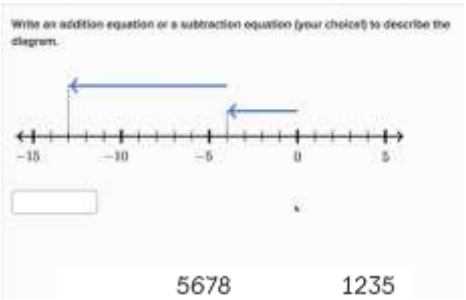
Addend, Total, Sum, Partition, increase, altogether

Addition Year 6

CPA Approach
(Concrete, Pictorial, Abstract)

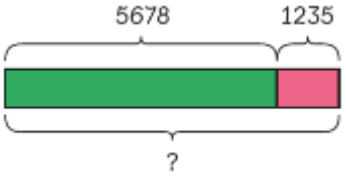
Mental methods

Should continue to develop, supported by a range of models and images, including the number line.
Including negative numbers and decimals



Written methods

As in Year 5, progressing to larger numbers, aiming for both conceptual understanding and procedural fluency with columnar method to be secured.
Continue to model with place value counters, objects, pictorial representations and the Bar Method (See Appendix 1)
Continue calculating with decimals, including those with different numbers of decimal places, and develop procedural fluency with renaming (carrying) to be secured.



789 + 642 becomes

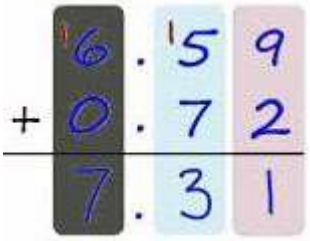
	7	8	9
+	6	4	2
1	4	3	1
	1	1	

Answer: 1431

Problem Solving

Teachers should ensure that pupils have the opportunity to apply their knowledge in a variety of contexts and problems (exploring cross curricular links) to deepen their understanding

Refer to Year 5 for support with development groups.



Vocabulary

Addend, Total, Sum, Partition, increase, altogether

Micro Steps

The year group markings relate to Mental Arithmetic sessions.
To be used also in planning where appropriate to learning

1. 2 digit + 2 digit: one or both the numbers are multiples of 10s no carrying **E.g. 36 + 20**	**26 + 40** **37 + 10**
2. 2 digit + 2 digit: maximum total in either column is 9 – no carrying **E.g. 36 + 42**	**56 + 33** **41 + 24**
3. 2 digit + 2 digit: totals to 10 or above – introducing carrying in the units column only, maximum total of 8 in the tens column. **E.g. 36 + 45**	**0s** **47 + 35** **0s** **59 + 24**
4. 2 digit + 2 digit: totals to 10 or above in the tens column. Carrying in 10s column only **E.g. 67 + 92**	**T** **92 + 83** **T** **71 + 62**
5. 2 digit + 2 digit: totals to 10 above in both columns. Carrying in both columns. **E.g. 74 + 89**	**96 + 85** **79 + 93**
6. 3 digit + 3 digit: totals to 10 or above carrying in the units column only, maximum total of 8 in the tens and 9 in the hundreds column **E.g. 348 + 436**	**0s** **357 + 218** **0s** **436 + 229**
7. 3 digit + 3 digit: totals to 10 or above carrying in the tens column only, maximum total of 8 in the units and 9 in the hundreds column. **E.g. 384 + 435**	**T** **392 + 481** **T** **681 + 191**
8. 3 digit + 3 digit: totals to 10 or above carrying hundreds column only, maximum total	**H** **613 + 913**

of 9 in the unit and 9 in the tens column. E.g. 723 + 412	H 722 + 813
9. 3 digit + 3 digit: totals to 10 or above carrying in 2 of all columns. E.g. 824 + 948	367 + 298 489 + 176
10. 3 digit + 2 digit: with and without carrying. Place larger number at top E.g. 456 + 79	345 + 78
11. 2 digit + 2 digit + 2digit: Introducing totalling above 20. Carrying in one or both columns. E.g. 35 + 96 + 74	46 + 85 69
12. Totalling 3 numbers: mix of 2 and 3 digit numbers. Carrying in one or all columns focus on columnisation. E.g. 53 + 643 + 95	45 +592 + 84
13. 4 digit + 4 digit: carrying in one or all columns (except thousands column- maximum total in thousands is 8). E.g. 1485 + 2953	1376 +2845
14. 4 digit + 4 digit: carrying in one or all columns. E.g. 6494 + 9845	5386 +8734
15. Totalling amounts of differing length including carrying. E.g. 4 digit + 2 digit 8493 + 87	5386 + 34
16. Totalling 3 amounts of differing lengths (up 50 4 digit) – focus on columnisation.	5386 38 + 863

E.g. 8734 + 27 + 953	
18. Introduction t0 decimal column addition: 2 digit + 2 digit (no carrying) **E.g. 3.4 + 4.6**	**3.3** **2.7** **+6.1** **+7.1**
19. Decimal column addition: 2 digit + 2 digit, carrying into ones and tens column. **E.g. 3.4 + 3.9**	**7.8** **9.9** **+8.3** **+3.2**
20. Decimal column addition: 2 digit + 2 digit carrying into ones and tens column. **E.g. 6.8 + 4.5**	**3.5** **+2.8**
21. Decimal column addition: 2 digit + 3 digit no carrying (1 dp) **E.g. 4.3 + 22.4**	**32.4 + 3.3** **22.4 + 2.2**
22. Decimal column addition: 2 digit + 3 digit with carrying (1 dp). Carrying in any column. **E.g. 4.3 + 25.8**	**28.7 + 5.6** **33.3+ 6.8**
23. Adding 3 or more numbers of any length (Including any length of decimal places.) **E.g. 4.56 + 645 + 83.3**	**5.63 + 400 + 3.8**

Year Group Objectives for Addition

Year 1

Pupils should be taught to:

- read, write and interpret mathematical statements involving addition (+),and equals (=) signs
- represent and use number bonds and related subtraction facts within 20
- add one-digit and two-digit numbers to 20, including 0
- solve one-step problems that involve addition, using concrete objects and pictorial representations, and missing number problems such as 7 = ? – 9

Year 2

Pupils should be taught to:

- solve problems with addition:
  - using concrete objects and pictorial representations, including those involving numbers, quantities and measures
  - applying their increasing knowledge of mental and written methods
- recall and use addition facts to 20 fluently, and derive and use related facts up to 100
- add numbers using concrete objects, pictorial representations, and mentally, including:
  - a two-digit number and 1s
  - a two-digit number and 10s
  - 2 two-digit numbers
  - adding 3 one-digit numbers
- show that addition of 2 numbers can be done in any order (commutative)
- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems

Year 3

Pupils should be taught to:

- add numbers mentally, including:
  - a three-digit number and 1s
  - a three-digit number and 10s
  - a three-digit number and 100s
- add numbers with up to 3 digits, using formal written methods of columnar addition and subtraction
- estimate the answer to a calculation and use inverse operations to check answers

- solve problems, including missing number problems, using number facts, place value, and more complex addition

Year 4

Pupils should be taught to:

- add numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate
- estimate and use inverse operations to check answers to a calculation
- solve addition two-step problems in contexts, deciding which operations and methods to use and why

Year 5

Pupils should be taught to:

- add whole numbers with more than 4 digits, including using formal written methods (columnar addition)
- add numbers mentally with increasingly large numbers
- use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Year 6

- Perform mental calculations, including with mixed operations and large numbers
- use their knowledge of the order of operations to carry out calculations involving the 4 operations
- solve addition multi-step problems in contexts, deciding which operations and methods to use and why
- solve problems involving addition, subtraction, multiplication and division
- use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy