Hackwood Primary Academy
Calculation & Fluency Policy – Progression in Addition
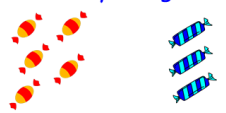### _Last updated: 20th September 2022_

This document outlines the progression in addition strategies throughout our academies. Teaching staff should consider using previously taught written methods as part of visually representing mental methods later in a child's school journey. For example, using a number line (taught as a written method in much of KS1) as a way to visually represent mental methods in Key Stage 2.

It has been carefully put together in line with the National Curriculum (2014), the Government's non-statutory guidance for teaching mathematics (June 2020) and our existing approach to teaching mathematics. This document has been organised respective of age-related expectations and learning should still be differentiated appropriately.

		Pupils should also learn to relate addition contexts and equations to mathematical diagrams such as bar models, number lines, tens frames with counters, and partitioning diagrams.			
Year 1	**In Year 1,** pupils need to be able to write and interpret expressions and equations to represent aggregation (putting parts together to make a whole) and augmentation (increasing a quantity by adding more). Aggregation How many altogether? 5 + 3 = 8 Augmentation How many baubles are there now? 3 + 1 = 4		_Bar model_	_Number line for counting single jumps_	_Tens frames_	_Part-whole model_
		Picture examples	8 6 2 6+2=8	5 + 4 = 9 0 1 2 3 4 5 6 7 8 9	8 + 4 = 12	9 5 + 4 = 9 10 7 3 7 + 3 = 10
		Lesson videos				
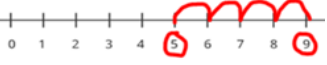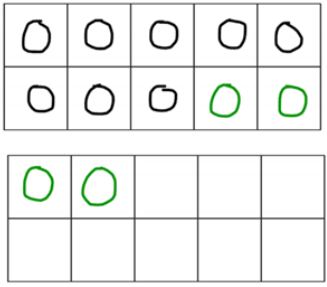
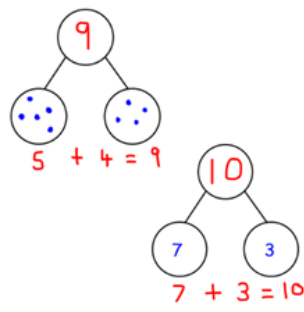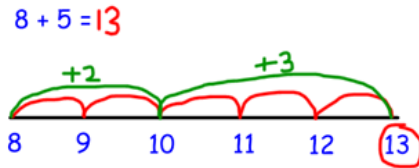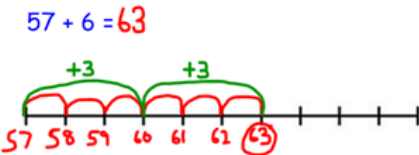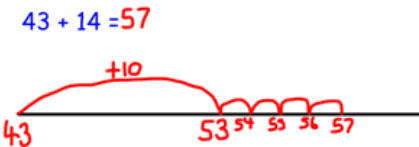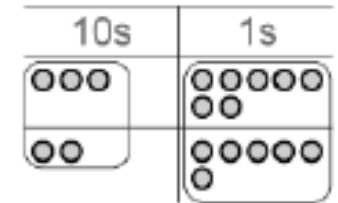|		*Number line addition*	*Using known facts – It's Nothing New!*	*Semi-formal written methods*
Year 2	**In Year 2,** pupils will at first use manipulatives, such as tens frames, to understand the strategies for adding across 10. However, they should later be able to carry out these calculations mentally, using their fluency in complements to 10 and partitioning. Pupils are fluent in these calculations when they no longer rely on extensive written methods. When adding within 100, pupils should be able to add multiples of 10 mentally, using their known addition facts. They should be able to demonstrate their reasoning either verbally or with manipulatives or drawings. The semi-formal methods are used to help pupils learn how to record the steps for adding 2 digit numbers that are not multiples of 10 using informal written notation. Pupils do not need to learn formal written methods for addition in Year 2, but column addition may be touched on as part of finding the total of addends in the semi-formal method.	*Picture examples* Bridging 10 (initially with single jumps but moving towards doing the green jumps mentally) $8 + 5 = 13$ As above but with a blank number line $57 + 6 = 63$ Adding teen numbers by partitioning (adding the ten and then ones) $43 + 14 = 57$ *Lesson videos*	Using complements to 10 to know complements to 100 $7 + 3 = 10$ $70 + 30 = 100$ Our 'Fluent in Five' approach includes revisits of this from Spring 2 onwards **Fluent in Five – Year 2** Year 2 — Spring 2: It's Nothing New (Link back to Y1): 10 + 10, 20 + 20, 30 + 30, 40 + 40, 50 + 50 Summer 1: It's Nothing New (Link back to Y1): 60 + 60, 70 + 70, 80 + 80, 90 + 90, 100 + 100 Summer 2: It's Nothing New (Link back to Y1): 10 + 90, 20 + 80, 30 + 70, 40 + 60	Using visuals to deepen understanding of partitioning 10s 1s Semi-formal method (always adding the tens first) $26 + 37 = 63$ $26 + 30 = 56$ $56 + 7 = 63$
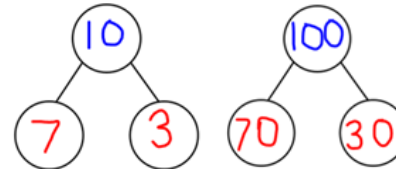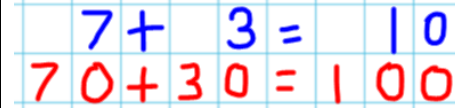
| Year 3 | **In Year 3,** pupils first consolidate their strategies from Year 2, particularly the semi-formal method. However, this is then built upon as pupils should be able to add up to three-digit numbers using the formal written method of column addition. This should include calculations with more than two addends, and calculations with addends that have different numbers of digits.

For calculations with more than 2 addends, pupils should add the digits within a column in the most efficient order. This could include:
- using number compliments to make 10
- using knowledge of doubles first | *Picture examples* | **Semi-formal method**

26 + 37 = 63
26 + 30 = 56
56 + 7 = 63 | **Column addition**

2 7 4
+ 3 5 4
6 2 8 | **Addends that have different amounts of digits**

6 2
+ 4 8 1
5 4 3 | **Calculating with more than 2 addends**

1 8 6
5 7
+ 4 3 4
6 7 7 |
| | | *Lesson videos* | | | | |

| Year 4 | **In Year 4,** pupils should extend column addition methods up to four-digit numbers. This should include calculations with more than two addends, and calculations with addends that have different numbers of digits.

For calculations with more than 2 addends, pupils should add the digits within a column in the most efficient order. This could include:
- using number compliments to make 10
- using knowledge of doubles first

Commas should be used in number sentences for numbers with more than 3 digits; however, they should <u>not</u> be used as part of the method itself.

When calculating time (start time, end time and duration), our policy is to do so using a number line. | *Picture examples* | **Column addition**

6 5 8 4
+ 2 7 3 9
9 3 2 3 | **Addends that have different amounts of digits**

3 3 6 2
+ 6 4 9
4 0 1 1 | **Calculating with more than 2 addends**

1 6 4 9
3 1 0 4
+ 5 1 6
5 2 6 9 |
| | | *Lesson videos* | | | |

Year 5		Picture examples	Column addition	Addends that have different amounts of digits	Calculating with more than 2 addends	Adding decimals up to 2dp	Adding decimals using placeholders

Year 5

In Year 5, pupils should extend column addition methods up to five-digit numbers. This should include calculations with more than two addends, and calculations with addends that have different numbers of digits. In addition, pupils should be able to add numbers with up to 2 decimal places.

For calculations with more than 2 addends, pupils should add the digits within a column in the most efficient order. This could include:
- using number compliments to make 10
- using knowledge of doubles first

Commas should be used in the number sentence for numbers with more than 3 digits; however, they should not be used as part of the method itself.

When calculating time (start time, end time and duration), our policy is to do so using a number line.

Picture examples

Column addition

```
  4 7 3 2 9
+ 3 5 6 3 1
  8 2 9 6 0
```

Addends that have different amounts of digits

```
  3 1 8 0 4
+     7 5 2 6
  3 9 3 3 0
```

Calculating with more than 2 addends

```
  6 5 0 0 3
        7 8 2
+         5 6
  6 5 8 4 1
```

Adding decimals up to 2dp

```
  2 4 . 3 6
+ 3 2 . 4 5
  5 6 . 8 1
```

Adding decimals using placeholders

```
  4 7 . 5 2
+ 8 1 . 7 0
1 2 9 . 2 2
```

Lesson videos

Year 6

In Year 6, pupils should extend column addition methods up to six-digit numbers, as well as those with up to 2 decimal places. This should include calculations with more than two addends, and calculations with addends that have different numbers of digits. In addition, pupils should be able to add numbers with up to 2 decimal places, including those with more than 2 addends.

For calculations with more than 2 addends, pupils should add the digits within a column in the most efficient order. This could include:
- using number compliments to make 10
- using knowledge of doubles first

Picture examples

Column addition

```
  3 7 8 6 5 8
+ 5 1 3 4 7 2
  8 9 2 1 3 0
```

Addends that have different amounts of digits

```
  9 7 4 7 3 2
+     8 2 6 6 2
1 0 5 7 3 9 4
```

Calculating with more than two addends

```
  5 3 7 2 3 8
        2 5 4 0
+     3 0 7 7 7
  5 7 0 5 5 5
```

Adding decimals up to 2dp

```
    6 . 8 5
+ 3 4 . 2 3
  4 1 . 0 8
```

Adding decimals using placeholders

```
  2 8 . 0 0
+   7 . 4 5
  3 5 . 4 5
```

Lesson videos