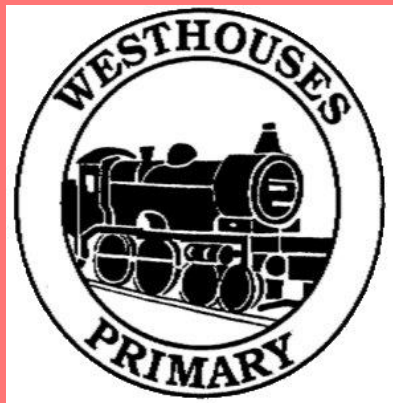# CALCULATION POLICY:

REVISED 2021

Early Learning Goal:

Children at the expected level of development will: automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10.

Children should experience practical calculation opportunities using a wide range of equipment, including small world play, role play, counters, cubes etc.
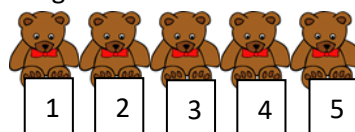
NURSERY 1

Counting all method.

Count out 4 objects   Count out 2 objects   Drag them into a line whilst counting the total

| 1 | 2 | 3 | 4 | 5 |

6

Wide range of real life objects can be used such as cups, plates, snack, children, fingers etc.

NURSERY 2

Counting on method

To support children in moving from counting all, children should still have two groups of objects but one should be covered so it cannot be counted.

Count out the two groups of objects as before…

Then cover up the large group with a cloth. Place a digit card on top to remind children what is underneath. They can then start their count at 4 and touch 5 and 6. Those who are ready can record their calculations by drawing.
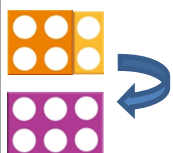
4

5

6
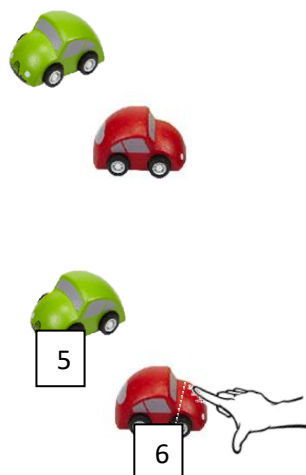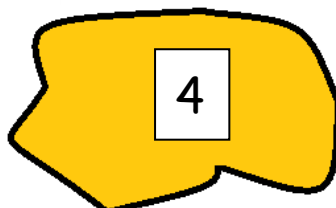
RECEPTION

Children continue to experience calculation through real life objects. Also given numicon to represent objects.

STEP 1

+

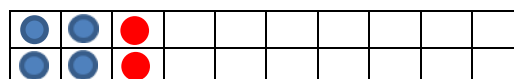Numicon boards pushed together. (4 + 2)

Numicon board which is same shape is chosen (eg – 6).

Pegs placed on the 6 board and two numbers being added placed on top.   1

STEP 2

Pegs/unifix to be placed in numicon formation on a grid for counting.

4 + 2 = 6

2

EARLY LEARNING ADDITION VOCABULARY:

add, more, and

make, sum, total, altogether

score

double

one more, two more, ten more…

how many more to make… ?

how many more is… than…?

is the same as

YEAR 1 END OF YEAR MENTAL ADDITION OBJECTIVES

*Read, write and interpret mathematical statements involving addition (+) and the equals sign (=)

Children should experience many opportunities to understand the purpose of the equals sign and that it does not just mean 'the answer'. Use of **balance scales** is recommended for children to visually understand this concept.

Eg: 2 + 4   =   1 + 3

*Represent and use number bonds within 20.

Bonds for different numbers including teen numbers should be regularly rehearsed in various ways.

YEAR 1   END OF YEAR WRITTEN OBJECTIVE:

*Solve one-step problems involving addition of one digit and two digit numbers to 20, including zero (using concrete objects and pictorial representations).

Children should continue to experience calculations involving concrete objects, numicon and unifix. Use of dienes apparatus will also be introduced.

STEP 1   Add two single digit numbers.

Place numicon pegs/unifix in a linear representation on a grid.
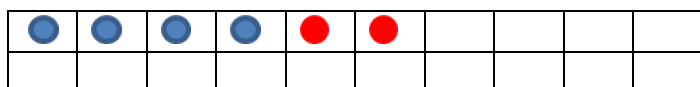
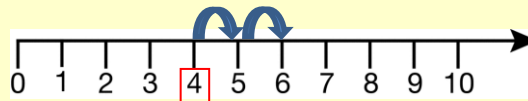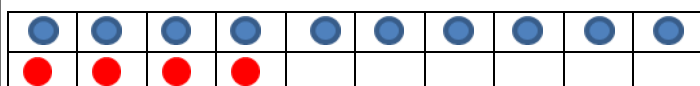Write the number sentence $4 + 2 = 6$

$6 = 4 + 2$

Number line representation modelled alongside children's practical method

*Children then encouraged to add 3 single digits with a total less than 10.

STEP 2 Add a single digit number to 10

Place unifix on a grid.

Write the number sentence $10 + 4 = 14$

$14 = 10 + 4$

Number line representation modelled alongside children's practical method

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STEP 3 Add teen numbers and single digits where total does not exceed 20

Children continue to rehearse finding totals until secure. Using their developing understanding of place value, they will move on to be able to use dienes apparatus to make teens numbers using tens and ones.
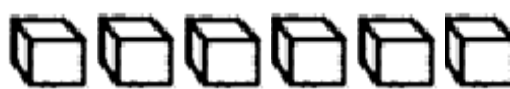
Eg:
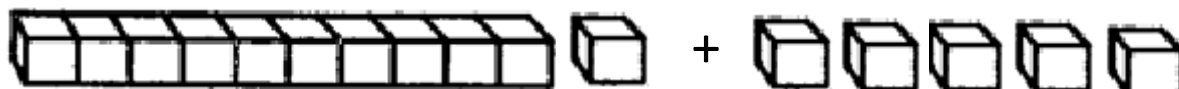
Combine ones to see final total.

$11 + 5 = 16$

3

16 = 11 + 5

YEAR 1 ADDITION VOCABULARY: words in red new to Year 1

+, add, more, plus

make, sum, total

altogether

score

double, near double

one more, two more… ten more

how many more to make…?

how many more is… than…?

how much more is…?

=, equals, sign, is the same as

YEAR 2 END OF YEAR MENTAL ADDITION OBJECTIVES
*recall and use addition facts to 20 fluently and derive related facts to 100.

*use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

YEAR 2 END OF YEAR WRITTEN OBJECTIVES
*Solve problems involving addition of 2 digit numbers using concrete objects and pictorial representations.
Concrete apparatus and representations are used in teacher modelling - Dienes' apparatus is used by children.

STEP 1: Use dienes apparatus to add two digit numbers where the ones do not cross the tens boundary.
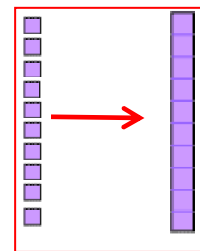Count the tens first then count on the ones.
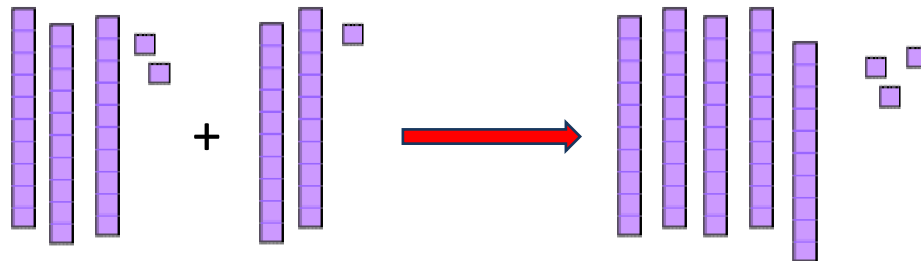
32 + 21 = 53   53 = 32 + 21

STEP 2: Use dienes apparatus to add three single-digit numbers which total more than 10.
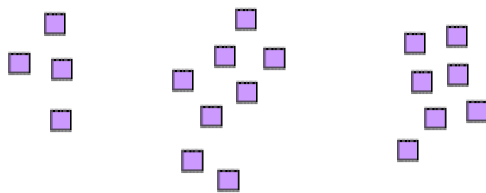
Identify if there are enough ones to exchange for a ten and carry out an exchange.

4 + 8 + 7 =
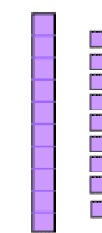
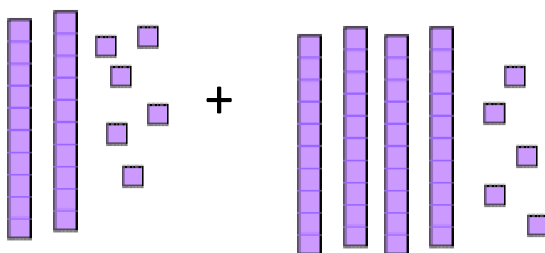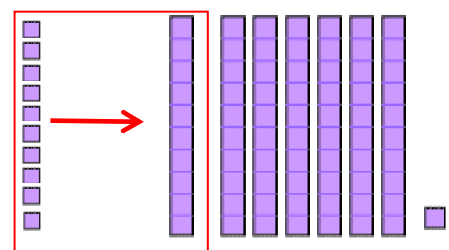4 + 8 + 7 = 19

Number line representation modelled alongside children's practical method

STEP 3: Use dienes apparatus to add two digit numbers where ones total more than ten.

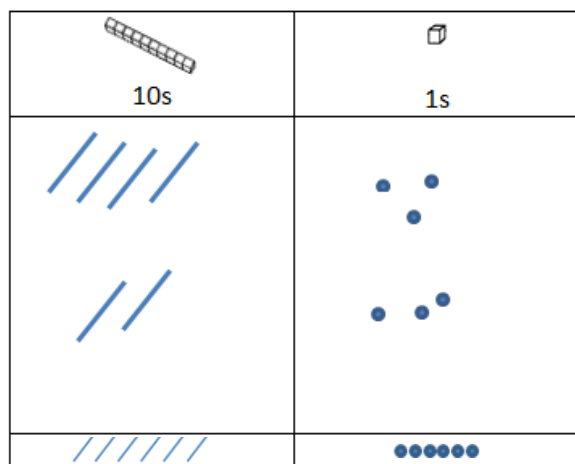Identify if there are enough ones to exchange for a ten and carry out an exchange.

5

26 + 45 = 71   71 = 26 + 45

(Photographs and number sentences are recorded in books)

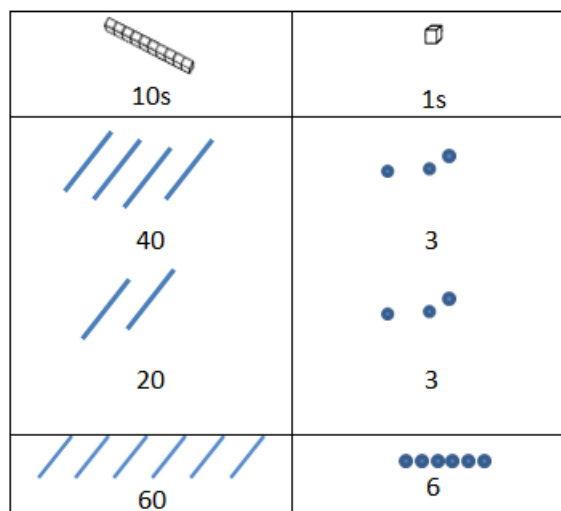STEP 4: Use more formal representations to add two-digit numbers where ones do not cross the tens boundary.

Manipulate dienes on place value charts.

43 + 23 = 66

STEP 5: Use more formal representations to add two-digit numbers where ones do not cross the tens boundary.

Manipulate the dienes on place value charts and write numbers in the columns.

43 + 23 = 66

YEAR 2 ADDITION VOCABULARY: words in red new to Year 2

+, add, addition, more, plus

make, sum, total

altogether

score

double, near double

one more, two more… ten more… one hundred more

how many more to make…?

how many more is… than…?

how much more is…?

=, equals, sign, is the same as, equivalent to

* tens boundary

YEAR 3 END OF YEAR MENTAL OBJECTIVES:

***Add mentally: a three-digit number and ones, a three-digit number and tens, a three-digit number and hundreds.** Use of number lines and extended hundred squares used to develop children's fluency.

***estimate the answer to a calculation and use inverse operations to check answers.**

***Use number facts and place value to solve more complex addition problems including missing number problems.**
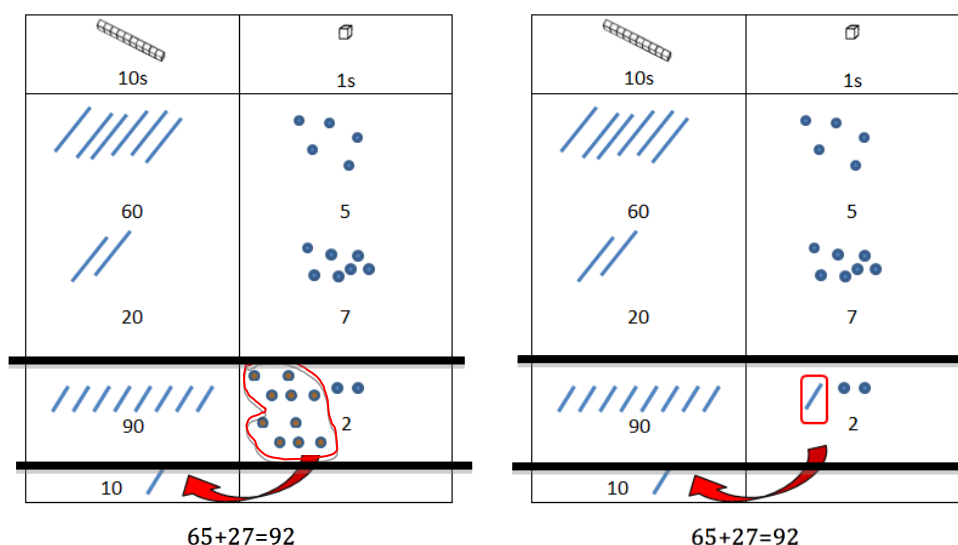Eg: 309 +   = 379   or   379 = 309 +

YEAR 3 END OF YEAR WRITTEN OBJECTIVE:
***Solve problems involving addition of numbers with up to three digits, using a formal written method of columnar addition.**

STEP 1: Use formal representation to add pairs of two digit numbers where ones total more than 10

Place dienes in place value grid and exchange ten ones for a tens rod.

Either / or:

65+27=92   65+27=92

STEP 2:

	10s	1s
	60	5
+	20	7
	90	2
	10	

STEP 3:

	10s	1s
	6	5
+	2	7
	9	2
	1	

STEP 4: Add 3 or more two digit numbers.

	10s	1s
	2	4
	2	1
+	4	7
	9	2
	1	

Use visual representations and apparatus to support (see step 1)

==Also, to ensure deeper understanding during Steps 1, 2, 3 and 4, include missing digits in TENS and/or ONES columns.==

STEP 5: Add pairs of three digit numbers using a formal representation.

100s	10s	1s
300	60	4
+ 200	50	3
600	10	7

364 +253 = 617

STEP 6: Add pairs of three digit numbers in a column.

100s	10s	1s
3	6	4
+ 2	5	3
6	1	7
1		

STEP 7: As step 6 but with three and four numbers which have 2 or three digits.

YEAR 3 ADDITION VOCABULARY: words in red new to Year 3

+, add, addition, more, plus

make, sum, total

altogether

score

double, near double

one more, two more… ten more… one hundred more

how many more to make …?

how many more is… than …?

how much more is…?

=, equals sign, is the same as

tens boundary, hundreds boundary

YEAR 4 END OF YEAR MENTAL OBJECTIVES:

*Estimate and use inverse operations to check answers to a calculation.

*add mentally with increasingly large numbers. (eg: 2,642 + 300 = 2,942)

YEAR 4 END OF YEAR WRITTEN OBJECTIVES
Solve two-step problems involving addition of numbers with up to 4 digits and decimals with two decimal places using the formal written method of columnar addition where appropriate.

STEP 1: Use a formal representation to add four digit whole numbers

Place dienes into place value columns and add vertically exchanging where necessary.

1000s	100s	10s	1s
3000	600	30	3
2000	500	40	5
6000	100	70	8

6178 = 3633 + 2545

STEP 2: Formal written column addition

	1000s	100s	10s	1s
	3	6	3	3
+	2	5	4	5
	6	1	7	8
	1			

Use commas to separate 1000s from 100s.

STEP 3: As step 2 but with mixed digits and 3 or 4 numbers

STEP 4: Add decimals with 2 decimal places.

Use representations and practical calculation with both dienes and coins (money). Dienes used should be different colour from dienes used for calculating with 100s, 10s and 1s.

Representation with coins

10s	1s	1/10s	1/100s
		5	8	1

Representation with dienes

10s	1s	1/10s	1/100s
	5	8	1

Visual and apparatus representations

£10	£1	10ps	1ps
10s	1s	1/10s	1/100s
	2	3	6
	3	4	5
	5	8	1
		1	

YEAR 4 ADDITION VOCABULARY: words in red new to Year 4

add, addition, more, plus, increase, sum, total, altogether

score

double, near double

how many more to make…?

is the same as, equals, sign

tens boundary, hundreds boundary, inverse

YEAR 5 END OF YEAR MENTAL OBJECTIVE:

*add mentally with increasingly large numbers. (eg: 12,642 + 2,300 =14,942)

*Use rounding to check answers to calculations and determine level of accuracy.

YEAR 5 END OF YEAR WRITTEN OBJECTIVE:

Solve multi-step problems involving addition of whole number with more than four digits and decimals number with up to 3 decimal places.

STEP 1

Use column addition to add many larger whole numbers.

1000s	100s	10s	1s
	5	6	2
4	7	4	9
2	2	3	6
	3	4	5
7	8	9	2
1	1	2	

+ (shown at left of the addition)

STEP 2: Add two 3 place decimal numbers.

1s	•	1/10s	1/100s	1/1000s
4	•	3	6	3
3	•	5	5	2
7	•	9	1	5
		1		

+ (shown at left of the addition)

YEAR 5 ADDITION VOCABULARY: words in red new to Year 5

add, addition, more, plus, increase sum, total, altogether

score

double, near double

how many more to make...?

equals, sign, is the same as

tens boundary, hundreds boundary ones boundary, tenths boundary inverse

YEAR 6 END OF YEAR MENTAL OBJECTIVES:
*Perform mental calculations, including with mixed operations and large numbers.

*use knowledge of order of operations to carry out calculations involving four operations.

*use estimation to check answers to calculations and determine an appropriate degree of accuracy.

YEAR 6 END OF YEAR WRITTEN OBJECTIVE:
*Solve multi-step problems involving addition of larger numbers decimals with mixed amounts of digits.

STEP 1 Add whole numbers and decimals with any number of digits

	100s	10s	1s	1/10s	1/100s
	4	0	1	2	0
		2	6	0	5
			0	9	1
+					
	4	2	8	1	6
			1		

	100s	10s	1s	1/10s	1/100s
	4	0	1	2	
		2	6	0	5
			0	9	1
+					

When adding decimals with different numbers of decimal places children should be taught to make them the same number of decimal places through understanding that 2 tenths is the same as twenty hundredths therefore, 0.2 is the same value as 0.20.

YEAR 6 ADDITION VOCABULARY:

add, addition, more, plus, increase sum, total, altogether

score

double, near double

how many more to make…?

is the same as, equals, sign

tens boundary, hundreds boundary, ones boundary, tenths boundary, inverse