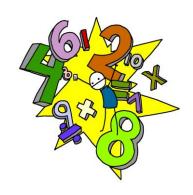# Bugle School Calculation Policy September 2021

Progression in calculations

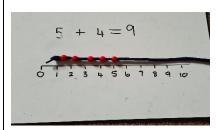## Addition

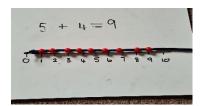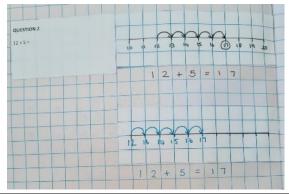| Method	Concrete	Pictorial	Abstract
YEAR 1 Combining two parts to make a whole The part-part-whole model can be used as a way of representing a calculation but is not a method.	Use Numicon to make the two parts and then combine them to make a whole. Place counters of 1 colour to represent one number and counters of a different colour to represent the other number. Combine to fill tens frames one at a time. 	Draw pictures to represent the numbers and count the total. Children to draw counters into images of tens frames.	Write the abstract number sentence and use a mental strategy to calculate.

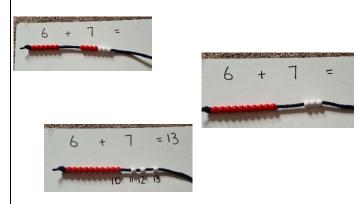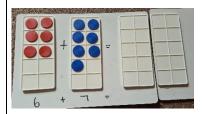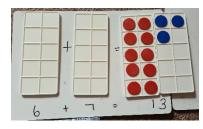|			
YEAR 1 Starting at the bigger number and counting on	Start with the larger number on a bead string and then count on to the smaller number 1 by 1 to find the answer. Children could also have a number line alongside this to correspond the written numeral with the spoken number. 	Start at the larger number on the number line and count on in ones. Children will be provided with a numbered number line to begin with, before being provided with a blank number line. As children become more confident/ use larger numbers, they may count on in bigger jumps. 	Place the larger number in your head and count on the smaller number to find your answer.
YEAR 1 Regrouping to make 10.	On a bead string separate the two numbers from the number sentence. Using the colours of the beads to support, regroup to make 10 then count on to find final answer. 	Children to draw images to represent the two numbers in the number sentence. Draw around images or redraw images to group into ten and then count on to find final answer. Children fill in tens frames using a different colour to represent each number in the number sentence.	Children to use mental strategy (using jottings to support) to make 10 and count on to find final answer.

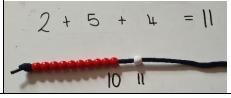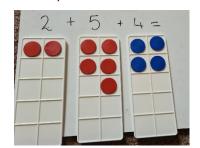|			
	On a tens frame place counters of 1 colour to represent one number and counters of a different colour to represent the other number. Combine to fill tens frames one at a time, count on from 10 to find final answer. 		
YEAR 2 Adding three single digits	Children should be encouraged to spot number bonds in the first instance. If no obvious number bonds, use a bead string to find the 3 numbers. Regroup to make 10 and add on the remaining beads. 	Children to draw images to represent the three numbers in the number sentence. Draw around images or redraw images to group into ten and then count on to find final answer. Children fill in tens frames using different	Children to use a mental strategy (supported by jottings) to regroup to make 10 and add on remaining number.

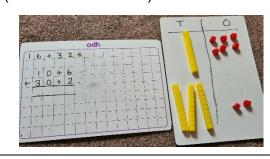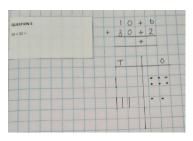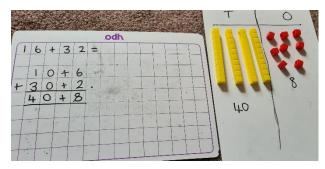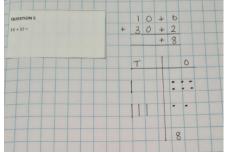|				
	Using a tens frame, make the 3 digits in 3 separate frames. Regroup to make 10 and add on the remaining counters (this may mean only 2 of the 3 tens frames are required for the final answer). 	colours to represent the different numbers in the number sentence.		
YEAR 2 Expanded Column method- no regrouping	**Children will need to have the written recording alongside the practical equipment.** Lay out the written expanded column method and make both numbers on a place value grid (use base 10 dienes). 	**Children will need to have the written recording alongside the drawings.** Lay out the written expanded column method and draw both numbers on a place value grid. 	Lay out the written expanded column method and complete following the steps as in pictorial without the drawing of base 10 / place value counters.	

Add up the ones and record underneath the ones column.

Add up the ones and record underneath the ones column.
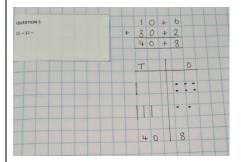

Add up the tens column and record underneath the tens column.

Add up the tens column and record underneath the tens column.

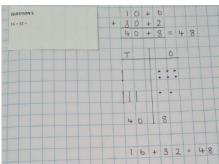Add together the two numbers recorded to give a final total.

Add together the two numbers recorded to give a final total.

YEAR 2 Expanded Column method-regrouping	**Children will need to have the written recording alongside the practical equipment.** Lay out the written expanded column method and make both numbers on a place value grid (use base 10 dienes).	**Children will need to have the written recording alongside the drawings.** Lay out the written expanded column method and draw both numbers on a place value grid (use base 10 dienes).	Lay out the written expanded column method and complete following the steps as in pictorial without the drawing of base 10 / place value counters.

Add up the ones and record underneath by partitioning the answer, recording the tens and ones accordingly with an addition symbol in between.
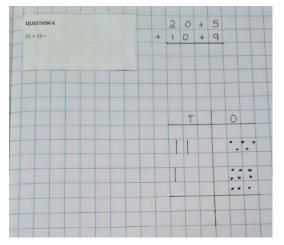

Add up the tens column (the value of the tens, not the number of them) and record underneath the partitioned answer to the ones column. Put an addition symbol to the left hand side of the two answers.
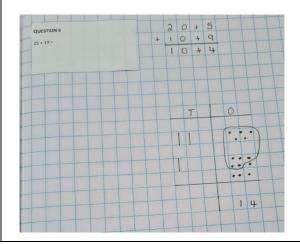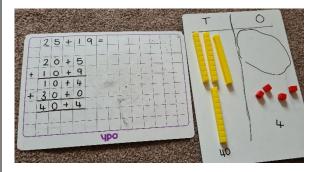

Add up the ones and record underneath by partitioning the answer, recording the tens and ones accordingly with an addition symbol in between.

Add together the ones columns from the two previous answers and record below the ones column (exchanging ones for tens where required).
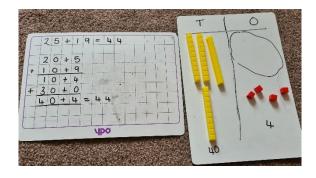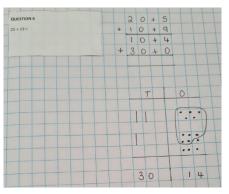

Add together the tens columns from the two previous answers and record below the ones column.
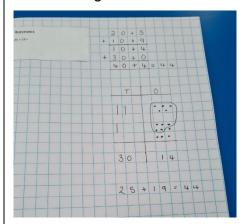

Add together the partitioned answers to get a final answer.

Add up the tens column (the value of the tens, not the number of them) and record underneath the partitioned answer to the ones column. Put an addition symbol to the left hand side of the two answers

Add together the ones columns from the two previous answers and record below the ones column and then add together the tens columns from the two previous answers and record below the tens column. Add together the partitioned answers to get a final answer.
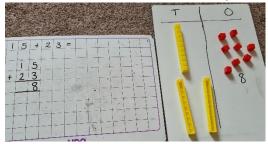
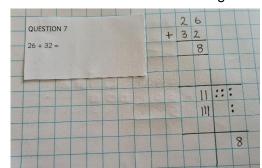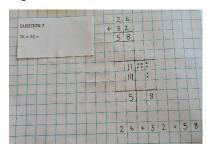| YEAR 3 up Column method - no regrouping Dienes are to be used in Year 3 and then Place Value Counters can be used alongside Dienes from Year 4 up.	**Children will need to have the written recording alongside the practical equipment**	**Children will need to have the written recording alongside the drawings**	Lay out the written column method and complete following the steps as in pictorial without the drawing of base 10 / place value counters.
	Lay out the written column method and make both numbers on a place value grid (use base 10 first before moving on to place value counters). Add up the ones column and record the total underneath and on written recording. Add up the tens column (the number of tens rather than the value of them) and record the total underneath and on written recording. The same routine is followed for each subsequent column as children work with larger numbers.	Lay out the written column method and draw both numbers on a place value grid (use base 10 first before moving on to place value counters). Add up the ones column and record the total underneath and on written recording. Add up the tens column (the number of tens rather than the value of them) and record the total underneath and on written recording. The same routine is followed for each subsequent column as children work with	

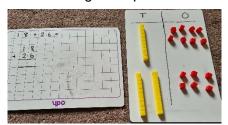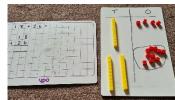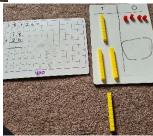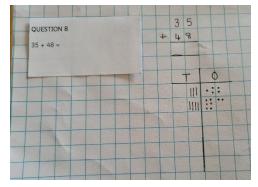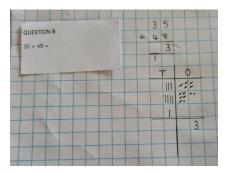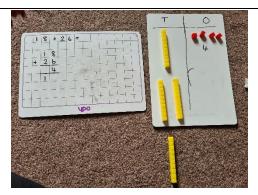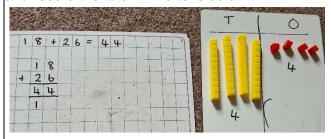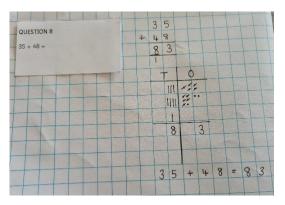|			
	As children move on to decimals, money and decimal place value counters can be used to support learning.	larger numbers. *As children move on to decimals, money and decimal place value counters can be used to support learning.*	
YEAR 3 up Column method - Regrouping Dienes are to be used in Year 3 and then Place Value Counters can be used alongside Dienes from Year 4 up.	**Children will need to have the written recording alongside the practical equipment** Lay out the written column method and make both numbers on a place value grid (use base 10 first before moving on to place value counters). Add up the ones column and exchange 10 ones for one 10. Record this on written method by placing the number of ones left in the ones column and the exchanged ten underneath the equals lines in the tens column. 	**Children will need to have the written recording alongside the drawings** Lay out the written column method and draw both numbers on a place value grid (use base 10 first before moving on to place value counters). Add up the ones column and exchange 10 ones for one 10. Record this on written method by placing the number of ones left in the ones column and the exchanged ten underneath the equals lines in the tens column. 	Lay out the written column method and complete following the steps as in pictorial without the drawing of base 10 / place value counters.

Add up the tens column (including the exchanged ten that was recorded underneath the equals sign) and record the total in the tens column.

The same routine is followed for each subsequent column as children work with larger numbers

 As children move on to decimals, money and decimal place value counters can be used to support learning

Add up the tens column (including the exchanged ten that was recorded underneath the equals sign) and record the total in the tens column.
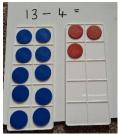

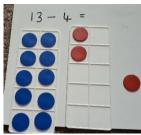The same routine is followed for each subsequent column as children work with larger numbers

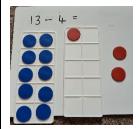*As children move on to decimals, money and decimal place value counters can be used to support learning*

Subtraction

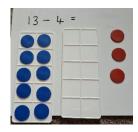| Method	Concrete	Pictorial	Abstract
YEAR 1 Taking away ones	Use physical objects, counters, cubes etc to show how objects can be taken away. 7 – 4 = 7 – 4 = 3	Cross out drawn objects to show what has been taken away. QUESTION 1 7 – 3 = O O O O Ø Ø Ø 7 – 3 = 4	Write the abstract number sentence and use a mental strategy to calculate (encourage children to picture the calculation in their head).
YEAR 1 Counting back	Make the larger number in your subtraction. Move the beads along your bead string as you count backwards in ones. 13 – 4 = 1 2 3 4 5 6 7 8 9 10 11 12 13 13 – 4 = 9 1 2 3 4 5 6 7 8 9 10 11 12 13 Use counters and move them away from the group as	Start at the bigger number and count back the smaller number showing the jumps on the number line. QUESTION 2 13 – 4 = 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 1 3 – 4 = 9 This can progress all the way to counting back using 2-digit numbers.	Write the abstract number sentence and use a mental strategy to calculate (encourage children to picture the number line in their head).

you take them away counting backwards as you go.

13 − 4 =

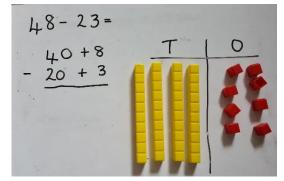| YEAR 2	Compare amounts and objects to find the difference.	Start at the smallest number and count how many jumps it takes to reach the biggest number.	Write the abstract number sentence and use a mental strategy to calculate (encourage children to picture the number line in their head).
Find the difference Bar models can be used to represent the problem but are not a method.	The difference is 2.	 Children could also draw a representation of the concrete method.	

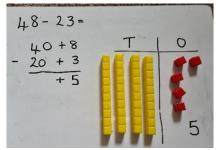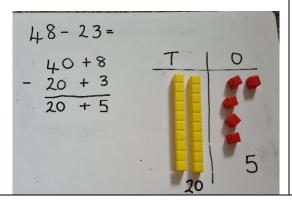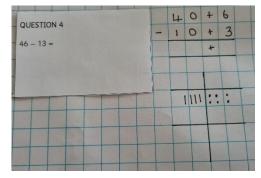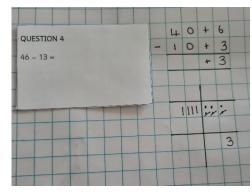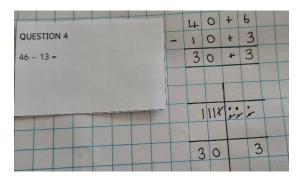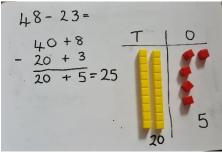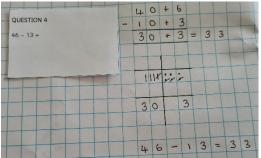| YEAR 2

Expanded Column Method – no regrouping | **Children will need to have the written recording alongside the practical equipment.**

Lay out the written expanded column method and make the biggest number on a place value grid (using base 10 dienes).

Take away the number of ones shown in the smallest number and record the number of ones remaining underneath.

Take away the number of tens shown in the smallest number and record the number of tens remaining underneath with an addition symbol between the two columns. | **Children will need to have the written recording alongside the drawings.**

Lay out the written expanded column method and draw the biggest number on a place value grid (using base 10 dienes).

Cross out the number of ones shown in the smallest number and record the number of ones remaining underneath.

Cross out the number of tens shown in the smallest number and record the number of tens remaining underneath with an addition symbol between the two columns. | Lay out the written expanded column method and complete following the steps as in pictorial without the drawing of base 10 / place value counters. |

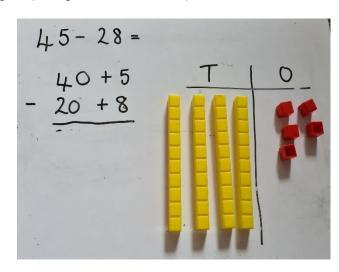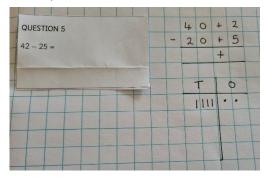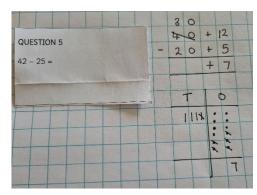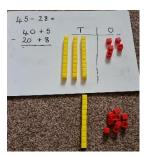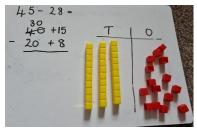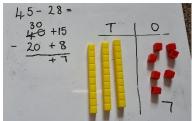|		Add together the partitioned answer to get a final answer.	Add together the partitioned answer to get a final answer.	
		$48 - 23 =$ $40 + 8$ $- 20 + 3$ $20 + 5 = 25$ T | O	QUESTION 4 $46 - 13 =$ 4 0 + 6 - 1 0 + 3 3 0 + 3 = 3 3 4 6 – 1 3 = 3 3	
YEAR 2 Expanded Column Method – regrouping		**Children will need to have the written recording alongside the practical equipment.** Lay out the written expanded column method and make the biggest number on a place value grid (using base 10 dienes). $45 - 28 =$ $40 + 5$ $- 20 + 8$ T | O Exchange a tens stick for ten ones cubes then take away the number of ones shown in the smallest number and record the number of ones remaining underneath. Record on written method by crossing out tens digit and writing the digit one below above and add adjust the	**Children will need to have the written recording alongside the drawings.** Lay out the written expanded column method and draw the biggest number on a place value grid (using base 10 dienes). QUESTION 5 $42 - 25 =$ 4 0 + 2 - 2 0 + 5 + T | O Cross out a tens stick and draw 10 additional ones then cross out the number of ones shown in the smallest number and record the number of ones remaining underneath. Record on written method by crossing out tens digit and writing the digit one below above and add adjust the ones digit so it reflects the new number of ones. QUESTION 5 $42 - 25 =$ 3 0 4 0 + 12 - 2 0 + 5 + 7 T | O	Lay out the written expanded column method and complete following the steps as in pictorial without the drawing of base 10 / place value counters.

ones digit so it reflects the new number of ones.

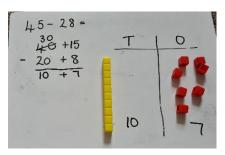

45 − 28 =
30
4̶0̶ +15
− 20 + 8
     + 7

Take away the number of tens shown in the smallest number and record the number of tens remaining underneath with an addition symbol between the two columns.

45 − 28 =
30
4̶0̶ +15
− 20 + 8
  10 + 7

Add together the partitioned answer to get a final answer.
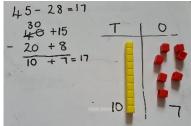
45 − 28 = 17
30
4̶0̶ +15
− 20 + 8
  10 + 7 = 17

Cross out the number of tens shown in the smallest number and record the number of tens remaining underneath with an addition symbol between the two columns.
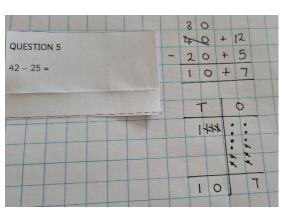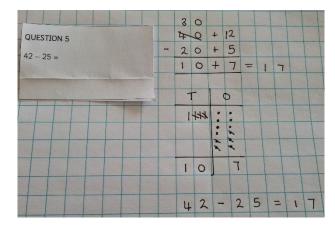
QUESTION 5

42 − 25 =

30
4̶0̶ + 12
− 20 + 5
  10 + 7

Add together the partitioned answer to get a final answer.

QUESTION 5

42 − 25 =

30
4̶0̶ + 12
− 20 + 5
  10 + 7 = 17

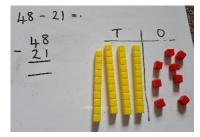42 − 25 = 17

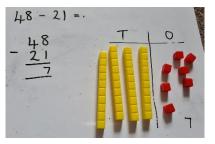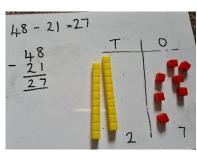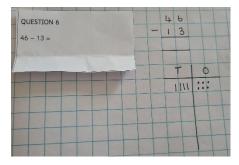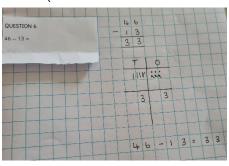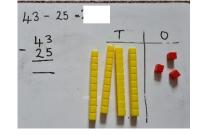| **YEAR 3 up**

Column method – no regrouping

Dienes are to be used in Year 3 and then Place Value Counters can be used alongside Dienes from Year 4 up. | **Children will need to have the written recording alongside the practical equipment**

Lay out the written column method and make the biggest number on a place value grid.

$48 - 21 =.$

Subtract the ones by removing the number of ones shown in the smallest number and record the total underneath and on written recording.

Subtract the tens column (the number of tens rather than the value of them) by removing the number of tens shown in the smallest number and record the total underneath and on written recording.

The same routine is followed for each subsequent column as children work with larger numbers.

As children move on to decimals, money and decimal place value counters can be used to support learning. | **Children will need to have the written recording alongside the practical equipment**

Lay out the written column method and draw the biggest number on a place value grid.

QUESTION 6 — $46 - 13 =$

Subtract the ones by crossing out the number of ones shown in the smallest number and record the total underneath and on written recording.

Subtract the tens column (the number of tens rather than the value of them) by crossing out the number of tens shown in the smallest number and record the total underneath and on written recording.

The same routine is followed for each subsequent column as children work with larger numbers.

As children move on to decimals, money and decimal place value counters can be used to support learning. | Lay out the written column method and complete following the steps as in pictorial without the drawing of base 10 / place value counters. |

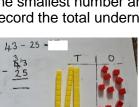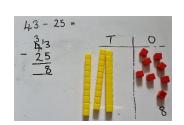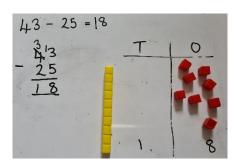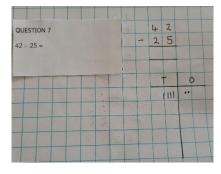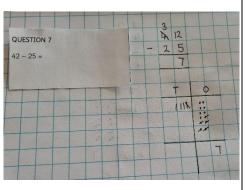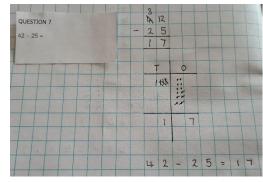| YEAR 3 up

Column method - regrouping

Dienes are to be used in Year 3 and then Place Value Counters can be used alongside Dienes from Year 4 up. | **Children will need to have the written recording alongside the practical equipment**

Lay out the written column method and make the biggest number on a place value grid.

Exchange one tens stick for ten ones cubes recording this by crossing out the tens digit and writing one fewer above and adjusting the ones digit to reflect the new amount of ones. Subtract the ones by removing the number of ones shown in the smallest number and record the total underneath.

Subtract the tens column (the number of tens rather than the value of them) by removing the number of tens shown in the smallest number and record the total underneath and on written recording.

 | **Children will need to have the written recording alongside the practical equipment**

Lay out the written column method and make the biggest number on a place value grid.

Cross out one one tens stick for draw in ten ones cubes recording this by crossing out the tens digit and writing one fewer above and adjusting the ones digit to reflect the new amount of ones. Subtract the ones by crossing out the number of ones shown in the smallest number and record the total underneath.

Subtract the tens column (the number of tens rather than the value of them) by removing the number of tens shown in the smallest number and record the total underneath and on written recording.

 | Lay out the written column method and complete following the steps as in pictorial without the drawing of base 10 / place value counters. |

| | The same routine is followed for each subsequent column as children work with larger numbers.

As children move on to decimals, money and decimal place value counters can be used to support learning. | The same routine is followed for each subsequent column as children work with larger numbers.

As children move on to decimals, money and decimal place value counters can be used to support learning. | |