Calculation policy

Number and Place Value

Milestone 1

Year 1

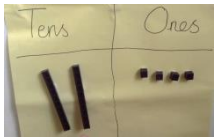
- Count in ones, forwards to 20 and backwards from 10 and then 20.

- Count, read and write numbers to 20 in numerals.
- Begin to explain what each digit represents in numbers to 20, and represent these numbers with structured resources.

- Count in tens to 100 forwards and backwards.
- Know "one more" and "one less" (with support of numberline) than any number to 20.

Year 2

- Count in steps of 2 from 0, and in tens from any number, forward or backward
- Recognise the place value of each digit in a two-digit number (tens, ones)



- Understand 'o' as a place holder (Zero Hero puppet)
- Identify, represent and estimate numbers using different representations, including the number line
- Compare and order numbers from 0 up to 100; use <, > and = signs
- Read and write numbers to at least 100 in numerals

Year 2 GD

- Using materials and a range of representations, pupils practise counting, reading, writing and comparing numbers to at least 100 and solving a variety of related problems to develop fluency.
- They count in multiples of 3 to support their later understanding of a third.
- Pupils introduced to numbers larger than 100 – develop recognition of patterns within the number system and represent them in different ways: including spatial representations
- Partition numbers in different ways (eg 23 = 20+3 and 23 = 10 +13) to support subtraction.
- They become fluent and apply their knowledge of numbers to reason with, discuss and solve problems that emphasise the value of each digit in a two-digit number.

Milestone 2

Year 1

- Count in ones, forwards to 50 and backwards from 20.

- Count, read and write numbers to 50 in numerals.
- Represents 2 digit numbers with structured resources and explain what each digit represents.
- Count in multiples of 2 to 20 –forwards
- Begin to know odd and even numbers to 10
- Know 1 more and 1 less to 20 and to 50 with support of a number line.

Year 2

- Count in steps of 2 and 5 from 0, and in tens from any number, forward or backward
- Read and write numbers to at least 100 in numerals and in words
- Use place value and number facts to solve problems

Milestone 3

Year 1

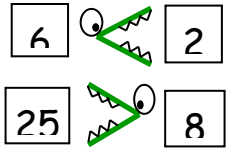
- Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number

- Count, read and write numbers to 100 in numerals
- Count in multiples of 2s, 5s and 10s.
- Given a number, identify 1 more and 1 less to 100.
- Identify and represent numbers using objects and pictorial representations including the numberline, and use the language of equal to, more than, less than (fewer), most, least

GD: **ordering** (first, second, third) **Compare** numbers to 100, using objects/pictorial representations,Counting in 2's, 5's 10's from different multiples ,Create repeating patterns with objects/ shapes.

Year 2

- Counts in steps of two, three, and five from 0, and in tens from any number, forward and backward
- Compares and orders numbers from 0 up to 100
- Uses < > and = signs correctly
- Uses place value and number facts to solve problems
- Partition any two-digit number into different combinations of tens and ones, explaining their thinking verbally, in pictures or using apparatus.



Happy learners, great achievers, believe it can be done.

Calculation policy

ADDITION

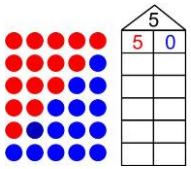
Year 1

+ = signs and missing numbers

- Practical and visual representations of +ing
- 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
3 = 3
2 + 2 + 2 = 4 + 2

- Facts to 5

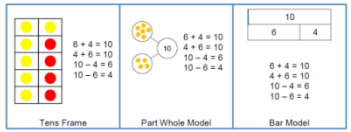


- Understanding the '5-ness' of a number
  -Finger counting – show me 5 and something
  - tens frame

= 5 "pow"

+ 3 = 5+3

- Number bonds up to 10 (6,7,8,9,10)
- Relate facts to 10 to facts to 20 and within



- 1 more/less over 10
- Inverse
- Adding '0'
- Missing numbers need to be placed in all possible places.

3 + 4 = □ □ = 3 + 4
3 + □ = 7 7 = □ + 4
□ + 4 = 7 7 = 3 + □
□ + ∇ = 7 7 = □ + ∇

The Number Line

Year 2

+ = signs and missing numbers

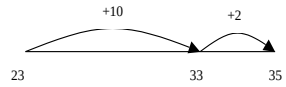
Continue using a range of equations as in Year 1 but with appropriate, larger numbers.
Extend to
14 + 5 = 10 + □
and
32 + □ = 100 35 = 1 + □ + 5
Chn to add 3 single digits together.

Add any 2 digit number using an efficient strategy, explaining their method verbally, in pictures or using apparatus

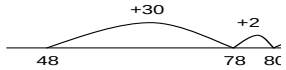
- **Partition into tens and ones and recombine**

12 + 23 = 10 + 2 + 20 + 3
= 30 + 5
= 35

- **Using a numberline**



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

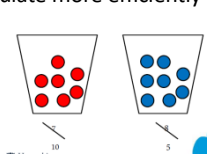


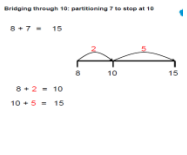
Move onto jumps in multiples of 10's and ones

48 + 32 =

- **Bridging through 10.**

Children should be able to regroup (using number bonds) to rename and calculate more efficiently (use counters, numicon, diennes, tens frames)





8 + 7 = 15
10+5 = 15

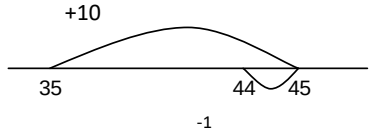
- Understanding of Number families (inverse) + = to check answers
- To solve one step word problems
- Recall all numberbonds to and within 10 and use these to

Year 2 GD

+ = signs and missing numbers

Add 9 or 11 by adding 10 and adjusting by 1
e.g.
Add 9 by adding 10 and adjusting by 1
35 + 9 = 44

Only use this as an initial tool to model process – chn to work mental when adjusting by one and explain verbally.



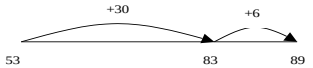
- Solve unfamiliar word problems that involve more than one step.
- Use reasoning about numbers and relationships to sove more complex problems and explain their thinking eg
  29+17 = 15 +4+ □

Continue using a range of equations as in Year 1 and 2 but with appropriate, larger numbers.

Partition into hundreds, tens and ones

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

36 + 53 = 53 + 30 + 6
= 83 + 6
= 89



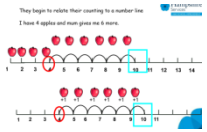
- Chn should be able to add:
  HTU + U
  HTU + multiple of 10
  HTU + multiples of 100

Add a near multiple of 10 to a two-digit number

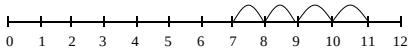
- Secure mental methods by using a number line to model the method. Continue as in Year 2 but with appropriate numbers
  e.g. 35 + 19 is the same as 35 + 20 – 1.

Happy learners, great achievers, believe it can be done.

- Children use a structured number line to count on in ones, multiples of 10. Children use number lines and practical resources to support calculation and teachers *demonstrate* the use of the number line. Model strategies:
  - Biggest number first, count on.



7+ 4

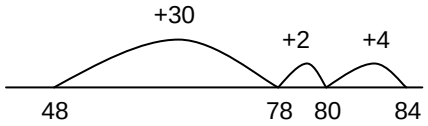


- Chn to begin to use empty number line for TU+ multiples of 10 (to 100)
- Solve simple word problems (using real life context)
- Number families
- 7+3 = 10
- 3+7 = 10
- 10-7 = 3
- 10-3 = 7

reason with and calculate bonds to and within 20, recognising other associated additive relationships (eg if 7 + 3 = 10, then 17 +3 = 20 and commutative laws: if 14+3 = 17, then 3+ 14 = 17)

- Children to use known facts (number bonds) to add efficiently

48 + 36 = 84



Horizontal expansion

80 + 3
+ 40 + 2
120 + 5 = 125

Calculation policy

SUBTRACTION

Year 1

- = signs and missing numbers

Use see-saw image to reinforce higher/lower/equal numbers

7 - 3 = □ □ = 7 - 3
7 - □ = 4 4 = □ - 3
□ - 3 = 4 4 = 7 - □
□ - ∇ = 4 4 = □ - ∇

- Understand subtraction as 'take away'

- Use the vocabulary related to subtraction and symbols to describe and record subtraction number sentences.

- Use practical and informal written methods to support the subtraction of a one-digit number from a one digit or two-digit number (up to 20) and a multiple of 10 from a two-digit number.

- Be able to take away the same number

physically move objects away
cross through picture
jump back on structured numberline
construct own numberlines

- Solve Simple word problems

I have 10 bananas. I eat 4. How many do I have left?

Year 2

- = signs and missing numbers

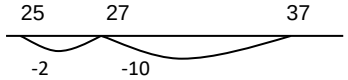
Continue using a range of equations as in Year 1 but with appropriate numbers.
Extend to 14 + 5 = 20 - □

- **Subtract any 2 digit number using an efficient strategy, explaining their method verbally, in pictures or using apparatus**

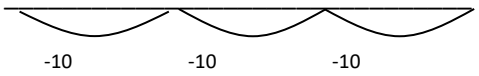
Where regrouping is not required:
Use of dienne jottings
partitioning into tens and ones

Use of place value to subtract (partition second number only)

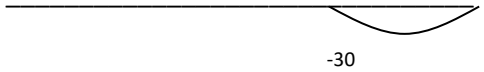
37 – 12 =



Separate jumps of ten



One jump of multiple of ten



Bridge through 10

52 – 37 =

- Use understanding of inverse to check answers
- To solve one step word problems

Year 2+

- = signs and missing numbers

Continue using a range of equations as in Year 1 and 2 but with appropriate numbers.

Subtract 9 or 11. Begin to add/subtract 19 or 21

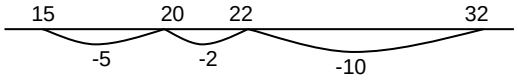
35 – 9 = 26 (to be done mentally)

Subtract mentally a 'near multiple of 10' to or from a two-digit number

Continue as in Year 2 but with appropriate numbers e.g. 78 – 49 is the same as 78 – 50 + 1

Use known number facts and place value to subtract

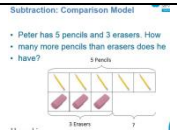
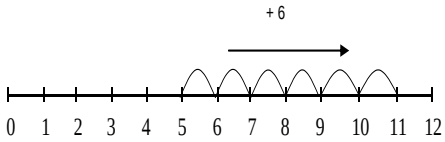
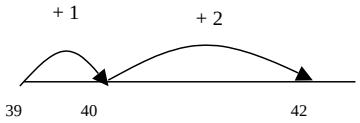
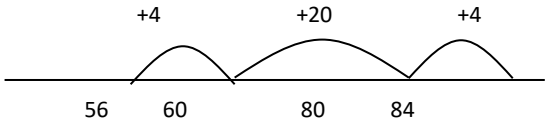
32 – 17 =



With practice, children will need to record less information and decide whether to count back or forward. It is useful to ask children whether counting up or back is the more efficient for calculations
such as 57 – 12, 86 – 77 or 43 – 28.

- Solve unfamiliar word problems that involve more than one step.
- Use reasoning about numbers and relationships to solve more complex problems and explain their thinking

Finding the difference

• Represent finding 'a difference' using the bar model • Find a 'difference' by counting up; using practical objects E.g. towers of multilink , Numicon,  I have saved 5p. The socks that I want to buy cost 11p. How much more do I need in order to buy the socks? 5p +_ = 11p  	Find a small difference by counting up 42 – 39 = 3 39 + _ = 42  	**Find a small difference by counting up** Continue as in Year 2 but with appropriate numbers e.g. 102 – 97 = 5 (97 + _ = 102) **Pencil and paper procedures** Complementary addition 84 – 56 = 28 

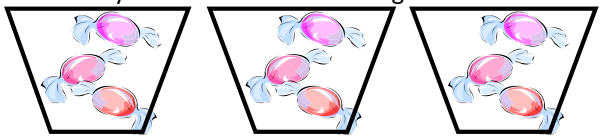
MULTIPLICATION GUIDELINES		
Year 1	Year 2	Year 2 GD

Calculation policy

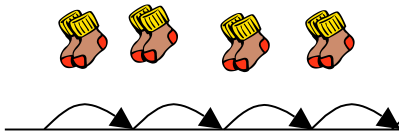
Counting using a variety of practical resources
Counting in 2s e.g. counting socks, shoes, animal's legs…
Counting in 5s e.g. counting fingers, fingers in gloves, toes…
Counting in 10s e.g. fingers, toes…

Pictures / marks
Solving simple 1 step problems (using a real life context).

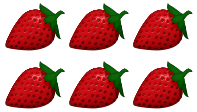
There are 5 sweets in one bag.
How many sweets are there in 3 bags?



Teachers to model link between pictorial groups and repeated addition on a structured number line.



Multiplication is related to doubling and counting groups of the same size (pictorial array – don't worry about formal recording of arrays, focus on the concept)



Looking at **columns**
2 + 2 + 2
3 groups of 2

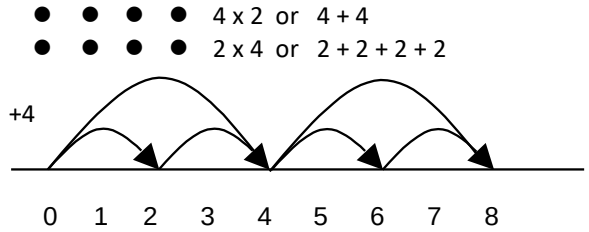
Looking at **rows**
3 + 3
2 groups of 3

x = signs and missing numbers

7 x 2 = □ □ = 2 x 7
7 x □ = 14 14 = □ x 7
□ x 2 = 14 14 = 2 x □
□ x ∇ = 14 14 = □ x ∇

Recall multiplication facts for 2, 5, 10 and use them to solve simple problems, demonstrating an understanding of commutatively as necessary

Arrays and repeated addition



Recognising x2 is the same as doubling

Partition
Children need to be secure with partitioning numbers into 10s and 1s and partitioning in different ways: 6 = 5 + 1 so
e.g. Double 6 is the same as double five add double one.

AND double 15
10 + 5
↓ ↓
20 + 10 = 30

Use of bar model to represent groups

x = signs and missing numbers
Continue using a range of equations as in Year 2 but with appropriate numbers.

- Recall and use multiplication facts for 2, 5 and 10 and make deductions outside of known facts (e.g. I know 92 won't be in the 5x table because it is not a multiple of 5).
- Solve unfamiliar word problems that involve more than one step.

Eg which has the most biscuits, 4 packets of 5 biscuits in each packet or 3 packets of biscuits with 10 in each packet?

Calculation policy

DIVISION GUIDELINES

Year 1

Sharing

Requires secure counting skills

-see counting and understanding number strand

Develops importance of one-to-one correspondence

See appendix for additional information on x and ÷ and aspects of number

Sharing – 6 sweets are shared between 2 people. How many do they have each?

Practical activities involving sharing, distributing cards when playing a game, putting objects onto plates, into cups, hoops etc.

Reinforce equal groups – opportunity to cover odds/evens

Grouping

Sorting objects into 2s / 3s/ 4s etc

How many pairs of socks are there?

There are 12 crocus bulbs. Plant 3 in each pot. How many pots are there?

Jo has 12 Lego wheels. How many cars can she make?

In the context of money count forwards and backwards using 2p, 5p and 10p coins

Year 2

÷ = signs and missing numbers (inverse)

6 ÷ 2 = □ □ = 6 ÷ 2

6 ÷ □ = 3 3 = 6 ÷ □

□ ÷ 2 = 3 3 = □ ÷ 2

□ ÷ ∇ = 3 3 = □ ÷ ∇

Recall division facts for 2, 5, 10 and use them to solve simple problems, demonstrating an understanding of commutatively as necessary.

Grouping

Link to counting and understanding number strand

Count up to 100 objects by grouping them and counting in tens, fives or twos;…

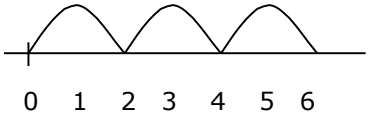
Find one half, one quarter and three quarters of shapes and sets of objects

6 ÷ 2 can be modelled as:

There are 6 strawberries.

How many people can have 2 each? How many 2s make 6?

6 ÷ 2 can be modelled as:



Practical grouping e.g. in PE

12 children get into teams of 4 to play a game. How many teams are there?

Use arrays to make link between multiplication and division (inverse).

Year 2+

÷ = signs and missing numbers

Continue using a range of equations as in Year 2 but with appropriate numbers.

- Recall and use multiplication and division facts for 2, 5 and 10 and make deductions outside of known facts (e.g. I know 92 won't be in the 5x table because it is not a multiple of 5).
- Solve unfamiliar word problems that involve more than one step.

Understand division as sharing and grouping

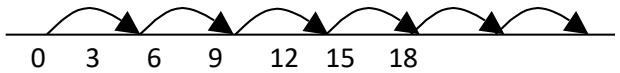
18 ÷ 3 can be modelled as:

Sharing – 18 shared between 3 (see Year 1 diagram)

OR

Grouping (repeated addition/subtraction)

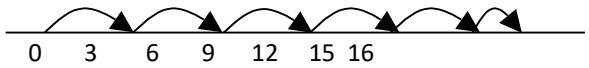
- How many 3's make 18?



Remainders

16 ÷ 3 = 5 r1

Sharing - 16 shared between 3, how many left over?

Grouping – How many 3's make 16, how many left over?

e.g.