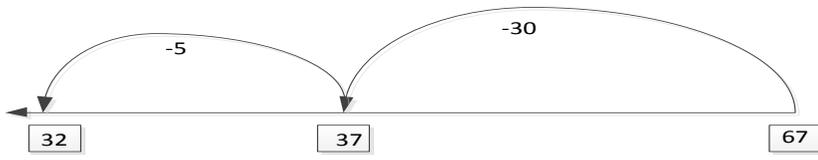|	Addition	Subtraction
	• Use of language: more, less, bigger, smaller, different, same • Begin to relate addition to combining two groups of objects e.g. Making 5 in different ways • One more; +1	• How many ways can you break up 5? • Begin to understand subtraction as 'taking away' e.g. • 5 take away 4. How many have I left in the cup? • One less; -1
Stage 1	• Add single digit numbers using fingers • Use materials to add up. • Use practical resources like dominoes to record number sentences e.g. 3+4=7 or 4+3=7 • Vary position of missing numbers in number sentences. • Develop understanding of addition as counting steps along a number line. • Use number tracks or number lines to record on. (Prepared and children's own.) • Put the largest number first when adding. • Know that addition is commutative. (Not affected by order) e.g. 15 + 4 is the same as 4 + 15.	• Continue to develop vocabulary including 'difference between' and 'how many less is … than …' • Use pictures and visual aids to record calculations. E.g. how many are left when 3 bricks are taken away? • Use number tracks or number lines and 100 squares. • Vary position of missing numbers in number sentences. • Begin to use and apply the inverse operation e.g. 6 + 5 = 11 11 – 5 = 6 • Find out 'how many more make …?' by counting on (complementary addition) • Count back from any number up to 100 • Subtract one digit numbers from 2 digit numbers
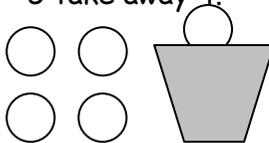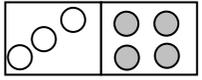
	Addition	Subtraction

Stage 2	• **Count on in 10's from any two digit number**
	• Continue to use practical resources
	• Use 100 square to support counting on.
	    o Count on in 1s
	    o Count on in 10s (e.g. 60 + 30)
	    o Count on in 10s and 1s (e.g. 41 + 24)
	• Begin to **partition** and recombine (seeing 12+15 as 10+10 and 2+5, then 20+7=27).
	• Use washing lines
	
	t u t u
	2 5 + 1 3
	
	20 + 10 = 30 3 + 5 = 8 30 + 8 = 38
	
	• And double washing lines
	
	t u t u
	4 9 + 3 7 40 + 30 = 70 9 + 7 = 16
	
	70 + 16 80 + 6 = 86
	
	• Addition of three 2 digit numbers adding tens first then units.
	• Know number bonds to 20
	• Use number tracks and empty number lines to support :
	
	+10 +7
	42 52 59
		• Continue to develop vocabulary of difference, less than, fewer than.
		• Number tracks and empty number lines to count back and begin to count on to find the difference.
		• There are 34 children in the class, 27 go to the hall. How many are left?
		•
		
		0 27 28 29 30 31 32 33 34 100
		
		• Partition the 2nd number and subtract.
		• E.g. 37 – 12 ⇨ 37 – 10 = 27
		              • 27 – 2 = **25**
		• (NB 'washing lines' don't work for subtraction)
		
		• Partition numbers in different ways e.g. 27 can be partitioned into 20+7 or 10+17 to support calculations using a 100 square.
		
		• Use number lines counting back in 10's then units.

	Addition	Subtraction

Stage 3	• *Mental methods include partitioning and compensating.*
	E.g. 31 + 17 is 30 + 10 + 7 + 1
	    31 + 17 is 30 + 18
	
	• Continue using informal written methods.
	
	• Use number lines, particularly empty number lines to model and support addition.
	
	• Begin to use expanded written method e.g. 45+17=
	
	    40 5
	  + 10 7
	    50 + 12 ⟶ 62
		• *Mental methods include partitioning and compensating.*
		E.g. 31 – 17 is 31 – 10 -7
		    31 – 17 is 30 – 16
		
		• Use number lines counting in multiples of 10 then units.
		
		• Informal counting on e.g.66 – 54 = …
		
		$6 + 6 = 12$
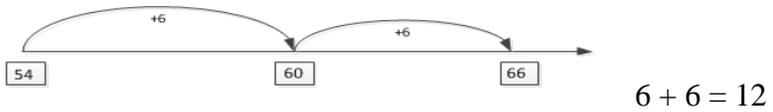		
		• Leading onto expanded written methods in a vertical layout:
		
		    60 6
		   -50 4
		    10 + 2 ⟶ 12
		
		• Counting back on a number line e.g. 67 – 35 = 32

	Addition	Subtraction

Stage 4
 	
	Mental methods –regular practise of mental addition including lists of multiple numbers. Explore how children visualise numbers in their heads and encourage them to use a variety of methods for manipulating the numbers.
	
	Expanded written method, vertical layout, adding the **least significant** number first.
	
	  2 6 4
	+1 4 8
	  1 2
	1 0 0
	3 0 0
	4 1 2
	
	Children will progress to using the compact written method, involving carrying, with least significant number first.
	
	    2 6 4
	+ 1 4 8
	    4 1 2
	     1 1
		Mental methods –regular practise of mental subtractions. Explore how children visualise numbers in their heads and encourage them to use a variety of methods for manipulating the numbers.
		
		Continue to use empty number lines.
		Expanded written methods using vertical layout:
		
		81 – 57 =
		80 1 ⟶ 70 11
		50 7 50 7
		              20 4 = 24
		
		This is a teaching stage
		
		Introduce compact written method: e.g. 63 - 27
		
		$^5 6 ^1 3$
		- 2 7
		   3 6

	Addition	Subtraction
Stage 5	• Continue using mental and informal strategies (number lines work well with time, money, weight etc.) • Extend written methods to column addition of two numbers less than 10,000. ==By end of year 4 (NC 2014)== • Use with decimals e.g. money, length, weight. ==By end of year 5 (NC 2014)== • Extend written methods to column addition of two or more numbers, or decimals in different contexts. ==By end of year 5 (NC 2014)== • Be able to select a suitable strategy (mental, informal, compact, calculator) when solving problems. ==By end of year 5 (NC 2014)==	• Teach calculations with 0 in the tens column e.g. 403 – 127 $$\begin{array}{r} {}^3\cancel{4}\,{}^9\cancel{0}\,{}^1{}3 \\ -\ 1\ 2\ 7 \\ \hline 2\ 7\ 6 \\ \hline \end{array}$$ • Extend to larger numbers and decimal money. ==By end of year 5 (NC 2014)== • Extend written methods for subtraction with decimal numbers with 2 decimal places in different contexts. ==By end of year 5 (NC 2014)== • Children will be able to choose the most efficient and appropriate method for each calculation. ==By end of year 5 (NC 2014)==

	Multiplication	Division
	Vocabulary: Jumps, hops, steps. Use of practical equipment to count in repeated groups of the same size e.g. Make a bead necklace 2red, 2blue, 2 red, 2 blue etc. A pair of socks, gloves, etc.	Share objects into equal groups e.g. share the fruit for a snack; give out one cup to each person.

Stage 1	- Draw pictures to show equal sets: e.g. how many wheels on 3 bikes? - Count on and back in twos to 20, fives to 50 and tens to 100 - Say the tens number that goes before/after a given one. - Know doubles of numbers to 10 - Sort objects into groups to count. - Solve practical problems that combine groups of twos, fives and tens. - There are 5 sweets in one bag, how many sweets are there in 3 bags?	- Draw pictures to show sharing and grouping: I have 8 wheels, how many bikes can I make? - Solve practical problems sharing groups into twos, fives and tens. 8 shared between 2 people
		    ** **
		    ** **
		  = 4 each - Know halves of numbers to 20 - Recognise odd and even numbers

Stage 2	- Count confidently in steps of two to 100, five to 100 and ten from any n^o to 100, and begin to count in steps of 3 and 4. - There are 4 apples in one box. How many apples in 6 boxes? - Create groups of objects and record as repeated addition and a number sentence
	
	Eg 5×3 (State as 5 'lots of 3')
	    $= 3 + 3 + 3 + 3 + 3$
	    $= 5 \times 3 = 15$ - Use of visual support such as Number tracks, empty number lines, 100 square etc.
		Develop vocabulary involved in division, divided by / between, repeated subtraction, how many groups of … in …
		
		   - Count confidently in steps of two, five and ten. - Using practical equipment to share into equal groups e.g. $15 \div 3 \rightarrow$ * * * * *
		             * * * * *
		             * * * * * = 5

Multiplication	Division

4 x 2
 	
 0 1 2 3 4 5 6 7 8 9
 	
 2 x 4
 	
 0 1 2 3 4 5 6 7 8 9
 	
 • Understand multiplication as repeated addition and making arrays using practical equipment
 e.g. 3 x 3 = XXX XXX XXX
 	
 • Double by partitioning   15 x 2 = 30
            10 + 5
            20 + 10 = 30
 • Relate multiplication and division
 • 2 x 4 = 8   so   8 ÷ 2 = 4
	• Relate grouping to arrays and use a number line to illustrate grouping and repeated subtraction e.g. 8÷2=
	
	     2 2 2 2 8 - 2 - 2 - 2 - 2
	
	                          = 4 groups of 2
	
	 0 2 4 6 8
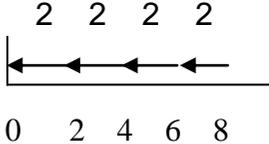	
	 • Know that dividing by 2 is the same as half
	
	 • Know that dividing by 4 is the same as quarter
	
	 • Begin to understand the concept of a remainder

Stage 3 • Know by heart multiplication facts for x2, x3, x4, x5, x8, x10 and recognise multiples of 2, 5 and 10 up to 1000. By end of year 3 (NC 2014) • Multiply a single digit number by x0, x1, x10, x100. • Double any multiple of 5 up to 50. • Derive related facts e.g. 7 x 5, 5 x 7, 35 ÷ 5, 35 ÷ 7. • Use practical apparatus and empty number lines to multiply two digit numbers by a single digit.	Use an empty number line for division e.g. 0 6 12 18 Divide any 3 digit multiple of 100 by 10 or 100 e.g. 800 ÷ 100 = 8 300 ÷ 10 = 30 Halve any multiple of 10 up to 100 e.g. 50 ÷ 2 = 25.

	Multiplication	Division
Stage 4	• Multiply a 2 digit number by a single digit number, multiplying the tens first and using informal jottings to show the stages of calculation e.g. $\quad$ 4x25 = (4x20) + (4x5) $\qquad\qquad$ = 80 + 20 $\qquad\qquad$ = 100 • Develop the extended written method of the grid method to multiply a two digit number by a single digit number e.g. e.g. 37 x 4 | X	30	7 | |---|---|---| | 4 | 120 | 28 | 120 + 28 = 148 By end of year 3 (NC 2014) **Note:** Grid method is a **transition** stage towards formal column method.	• Developing and refining written methods for division by dividing a two digit number by a single digit e.g. $\quad$ 84 ÷ 7 = $\quad$ 70 + 14 $\qquad\qquad\qquad$ ↓ $\quad$ ↓ $\quad$ (÷ 7) $\qquad\qquad\qquad$ 10 + 2 = 12 • Use the repeated subtraction or 'chunking' method: By end of year 4 N.B. Chunking not included as statutory requirement in 2014 NC Repeated subtraction – how many sixes in 27? e.g. 27 ÷ 6 = 4 r.3 $\quad$ 27 $\quad$ - 6 $\quad$ 2 1 $\quad$ - 6 $\quad$ 1 5 $\quad$ - 6 $\quad$ 9 $\quad$ - 6 $\quad$ 3 Leading to subtracting larger chunks such as multiples of 10 e.g. 148 ÷4= $\quad$ 148 $\quad$ - 40 (**10**x4) $\quad$ 108 $\quad$ - 40 (**10**x4) $\quad$ 68 $\quad$ - 40 (**10**x4) $\quad$ 28 $\quad$ - 28 (**7**x4) $\quad$ 0 148 ÷ 4 = 10+10+10+7= 37

	Multiplication	Division
Stage 5		

Multiplication

Extending written methods, encouraging estimation first.
Grid method (HTU x U)

e.g. 247 x 7

x	200	40	7
7	1400	280	49

1400+280+49=1729

Grid method (TU x TU)

e.g. 62 x 36

x	60	2
30	1800	60
6	360	12

2160+72 = 2232

This then leads to a compact written method for multiplication e.g.

```
    2 4 6
  x     7
      4 2  (  6 X 7)
    2 8 0  ( 40 X 7)
  1 4 0 0  (200 X 7)
  1 7 2 2
```

The annotations would be modelled for the children, not expected of them.

```
    246
  x   7
  1722
    3 4
```

<mark>By end of year 4 (NC 2014)</mark>

Division

Extending written methods, encouraging estimation first.

Children continue to use the 'chunking' method before progressing to the short division method with repeated subtraction e.g. 196 ÷ 6.

```
      32 r. 4
  6) 196
  -  60   (10x6)
     136
  -  60   (10x6)
      76
  -  60   (10x6)
      16
  -  12   (2x6)
       4
```

The annotations would be modelled for the children, not expected of them.

This then contracts to the more compact short division method e.g.

```
      32 r. 4
  6) 196
```

<mark>By end of year 5 (NC 2014)</mark>

	Multiplication	Division
Stage 6	Long multiplication to be applied to problem solving including measures, distance, weight, capacity and money and fractions. To be practiced throughout year 5 and 6 e.g. Farmer Jones wants to fence in a square field. Each side is 118.35 m. How much fence does he need? $$\begin{array}{r} 118.35 \\ \times\ 4 \\ \hline 473.40 \ \text{m} \\ \small{3\ 1\ 2} \end{array}$$ e.g. A group of 17 people eat in a restaurant. The menu lists the meal price at £23.58 a head. How much is the total cost of the meal?	Children will progress to using the long division method. They will solve problems to find a remainder, show the remainder as a fraction, or find the answer as a decimal. By end of year 6 (NC 2014) **Long division** 432 ÷ 15 becomes $$\begin{array}{r} 2\ \ 8\ \ \text{r}\,12 \\ 1\ 5\,|\,4\ \ 3\ \ 2 \\ 3\ \ 0\ \ 0 \\ \hline 1\ \ 3\ \ 2 \\ 1\ \ 2\ \ 0 \\ \hline 1\ \ 2 \end{array}$$ Answer: 28 remainder 12

432 ÷ 15 becomes

```
          2   8
  1   5 │ 4   3   2
          3   0   0      15×20
          ─────────
          1   3   2
          1   2   0      15×8
          ─────────
              1   2
```

$$\frac{12}{15} = \frac{4}{5}$$

Answer: $28\frac{4}{5}$

432 ÷ 15 becomes

```
          2   8 · 8
  1   5 │ 4   3   2 · 0
          3   0   ↓
          ─────────
          1   3   2
          1   2   0       ↓
          ─────────
              1   2   0
              1   2   0
              ─────────
                      0
```

Answer: 28·8