Phase 1			
Domain: **Place Value**			

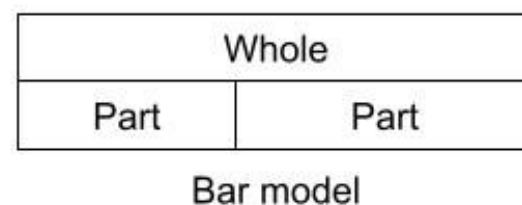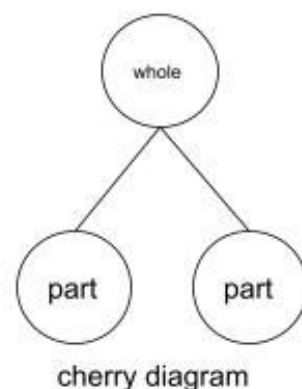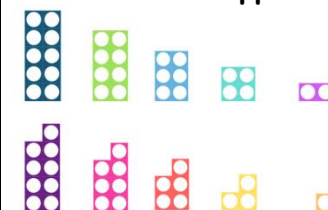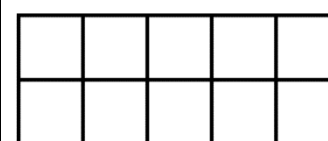| Revision year 1	New learning- KPIs:	Resources to support learning:	Common misconceptions:
- I can count within 100, forwards and backwards, starting with any number. - I can reason about the location of numbers to 20 within the linear number system, including comparing using ‹ › and = - I know that 10 ones are equivalent to 1 ten - I know that multiples of 10 are made up from a number of tens, for example, 50 is 5 tens. - I can place the numbers 1 to 9 on a marked, but unlabelled, 0 to 10 number line. - I can estimate the position of the numbers 1 to 9 on an unmarked 0 to 10 number line. - I can count forwards and backwards to and from 100 **I can count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number** **I can count, read and write numbers to 100 in numerals; count in multiples of 2s, 5s and 10s**	- I can recognise the place value of each digit in two-digit numbers, and compose and decompose two-digit numbers using standard and non-standard partitioning. - I can reason about the location of any two digit number in the linear number system, including identifying the previous and next multiple of 10. **I can recognise the place value of each digit in a two-digit number (tens, ones)** **I can identify, represent and estimate numbers using different representations, including the number line** **I can compare and order numbers from 0 up to 100; use ‹, › and = signs** **I can read and write numbers to at least 100 in numerals and in words** **I can use place value and number facts to solve problems** **Visualisation:** **Part whole model** to show partitioning in a standard and non-standard way **Bar model** to model the partitioning of numbers	Numicon can be used to support children with number bonds to 10. **Tens frames** with **place value counters** to support children to understand that 10 of something fit into… **Dienes** to show children the relationship between numbers and what 'ten times bigger' looks like **Bundling sticks** help children group objects into tens and ones. **Number lines** to identify or place two-digit numbers on marked number lines.	- Incorrect articulation of "teen" and "ty" numbers. - Reversals of 2-digit numbers – is this a minor error or lack of place value understanding? - Pupil continues to count in ones for calculation. - Difficulty adding ten to a number quickly – do they use place value understanding and knowing the importance of "ten" in the number system? - Incorrect use of "‹" and "›" symbols.

- I can, given a number, identify 1 more and 1 less
- I can identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least
- I can read and write numbers from 1 to 20 in numerals and words

100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9

Gattegno charts to the value of each digit in a 2-digit number; this resource helps children to build numbers and understand the value of the digits in the number
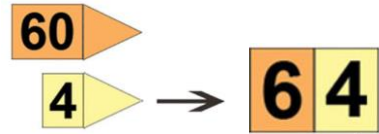
Place Value Arrow cards to show the value of each digit in a number
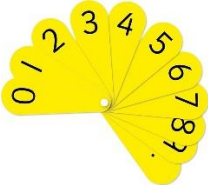
Number fans are a tool used in mathematics as an alternative to flashcards. They can be easier for younger children to handle and demonstrate 1 and 2-digit numbers.

Vocabulary:
ones, tens, hundreds, digit, one-, one of two-digit number, 'teens' number
place, place value, stands for, represents, the same number as, as many as, equal to, partition, order, regroup, numeral, words, hundreds
Of two objects/amounts:
greater, more, larger, bigger, less, fewer, smaller, less,
Of three or more objects/amounts:
greatest, most, biggest, largest, least, fewest, smallest
one more, ten more, one less, ten less,
compare, order, size
first, second, third… tenth… twentieth, twenty-first, twenty-second…
last, last but one, before, after, next, between, half-way between above, below

| Domain: **Number facts** |
|---|

Revision year 1:

- I can develop fluency in addition and subtraction facts within 10.
- I can count forwards and backwards in multiples of 2, 5 and 10, up to 10 multiples, beginning with any multiple, and count forwards and backwards through the odd numbers.
- I can develop fluency in addition and subtraction facts within 10.
- **I can read and write numbers from 1 to 20 in numerals and words.**
- **I can count in multiples of twos, fives and tens (NPV NC statement)**

New learning- KPIs:

- I can secure fluency in addition and subtraction facts within 10, through continued practice.
- I can group objects in equal groups of 2, 5 and 10

- **I can count in steps of 2, 3, and 5 from 0, and in 10s from any number, forward and backward**
- **I can recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100**
- **I can recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers**

Visualisation:

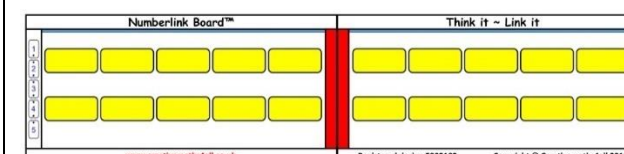- **Empty 100 square** to show how to share into equal groups

5 − 0 = 5 ●●●●● 5 + 0 = 5
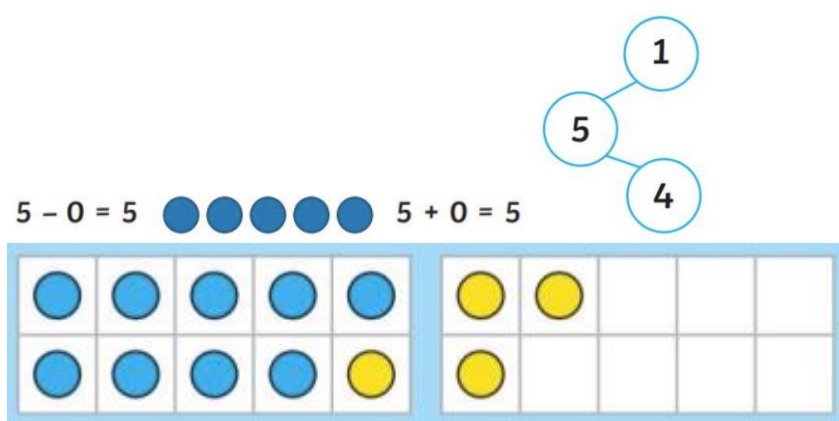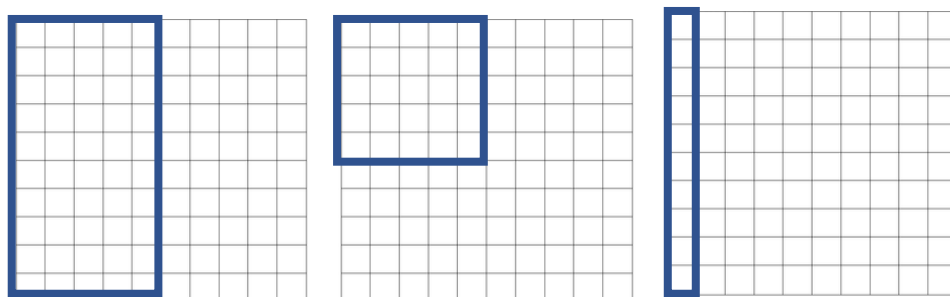
Resources to support learning:
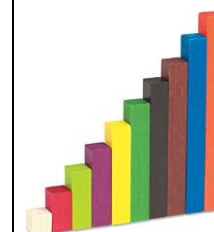
Cuisenaire rods where the orange rod can represent 1 whole

0 1 2 3 4 5 6 7 8 9 10

Number lines to show children equal intervals

Numberlink boards to show children the relationship of multiplication facts and to teach the 1, 10, 5 derive structure

Common misconceptions:

- A common error when calculating complements is to end up with a total that is too large, as children typically make an extra unit of 10
- Not making the parts equal – especially when placing intervals on a number line
- Pupil continues to count in ones for calculation.
- Difficulty adding ten to a number quickly – do they use place value understanding and knowing the importance of "ten" in the number system?
- Unable to count in 2s, 5s and 10s and use to count a collection of objects efficiently to solve a problem.
- Unable to spot patterns in multiples – therefore won't be able to generalise or predict.
- Confusion over "number of groups" and "group size".

+	0	1	2	3	4	5	6	7	8	9	10
0	0+0	0+1	0+2	0+3	0+4	0+5	0+6	0+7	0+8	0+9	0+10
1	1+0	1+1	1+2	1+3	1+4	1+5	1+6	1+7	1+8	1+9	
2	2+0	2+1	2+2	2+3	2+4	2+5	2+6	2+7	2+8		
3	3+0	3+1	3+2	3+3	3+4	3+5	3+6	3+7			
4	4+0	4+1	4+2	4+3	4+4	4+5	4+6				
5	5+0	5+1	5+2	5+3	5+4	5+5					
6	6+0	6+1	6+2	6+3	6+4						
7	7+0	7+1	7+2	7+3							
8	8+0	8+1	8+2								
9	9+0	9+1									
10	10+0										

Phase 2

| Domain: **Addition and Subtraction (securing mental calculation)** Spine 1.11 |
|---|

Revision year 1:
- I can compose numbers to 10 from 2 parts, and partition numbers to 10 into parts, including recognising odd and even numbers.
- I can read, write and interpret equations containing addition (+), subtraction (-) and equals (=) symbols, and relate additive expressions and equations to real-life contexts.
- I can learn and use number bonds to 10, for example:8 + _ = 10 Partition numbers within 10, for example: 5 = 2 + 3

- **I can read, write and interpret mathematical statements involving**

New learning- KPIs:
- I can add and subtract across 10 for example: 8 + 5 =13, 13 - 5 = 8
- I can recognise the subtraction structure of 'difference' and answer questions of the form, "How many more…?".
- I can add and subtract within 100 by applying related one-digit addition and subtraction facts: add and subtract only ones or only tens to/from a two digit number.
- I can add and subtract within 100 by applying related one-digit addition and subtraction facts: add and subtract any 2 two digit numbers.

- **I can solve problems with addition and subtraction:**

    using concrete objects and pictorial representations, including those involving numbers, quantities and measures

    applying their increasing knowledge of mental and written methods

- **I can recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100**
- **I can add and subtract numbers using concrete objects, pictorial representations, and mentally, including:**
  a two-digit number and 1s
  a two-digit number and 10s
  2 two-digit numbers
  adding 3 one-digit numbers
- **I can show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot**

Resources to support learning:
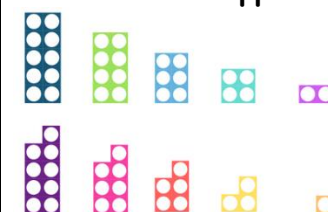
Numicon can be used to support children to understand the law of commutativity
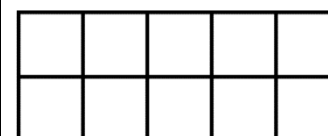
Tens frames with **place value counters** to support children to understand that 10 of something fit into

Dienes to show children the relationship between numbers and what 'ten times bigger' looks like

Common misconceptions:
- Thinking that subtraction is commutative. The difference and subtrahend can swap places in a calculation and the calculation will still be accurate. However, this isn't showing the law of commutativity
- In missing digit calculation, not understanding when and how to use the inverse operation
- Pupils who struggle to correctly order numbers when in a context.
- Pupils who revert to counting in ones rather than applying known facts.

- addition (+), subtraction (–) and equals (=) signs
- **I can represent and use number bonds and related subtraction facts within 20**
- **I can add and subtract one-digit and two-digit numbers to 20, including zero**
  I can solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ___ – 9.

- **I can recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems**

Spine 1.11
TP1: Addition of three addends can be described by an aggregation story with three parts.
TP2: Addition of three addends can be described by an augmentation story with a '*first..., then..., then..., now...*' structure.
TP3: The order in which addends (parts) are added or grouped does not change the sum (associative and commutative laws).
**TP4:** When we are adding three numbers, we choose the most efficient order in which to add them, including identifying two addends that make ten (combining).
TP5: We can add two numbers which bridge the tens boundary by using a 'make ten' strategy.
TP6: We can subtract across the tens boundary by subtracting *through* ten or subtracting *from* ten.

Visualisation:
- **Part whole model** to show partitioning in a standard and non-standard way
- **Bar model** to model the partitioning of numbers
- **Number line** to show partitioned addition or subtraction and to model the strategy of counting on or counting back

cherry diagram
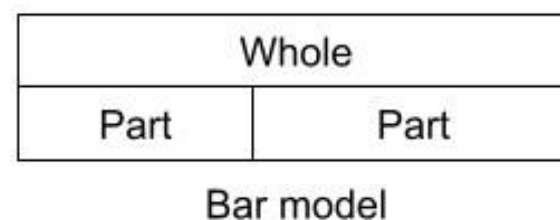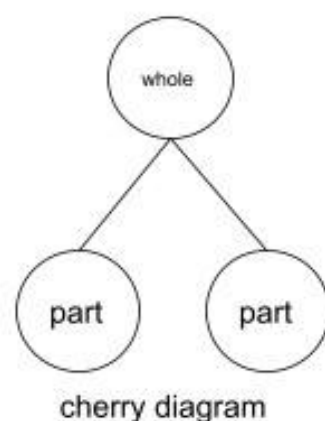
Bar model

- **Bar model** to solve comparative addition and difference problems

Place value counters and dienes to show the partitioning of two-digit and three-digit numbers

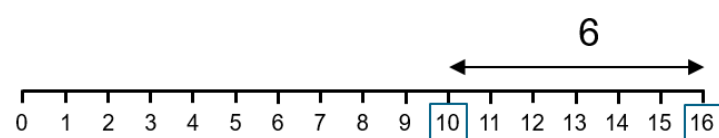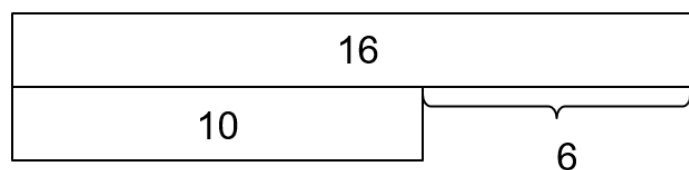**Number lines** to show children the position of numbers including negative numbers and how to round to the nearest multiple of…

Place Value Arrow cards identify how digits change in addition and what this looks like when the number is blended back together
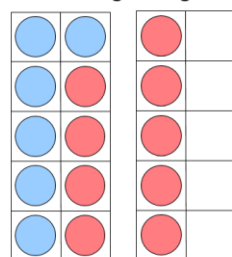
10 + ☐ **= 16**　　　**16 – 10 =** ☐

16
10

6

6

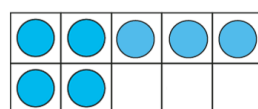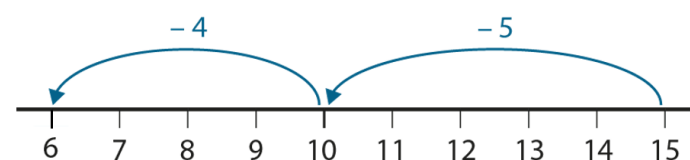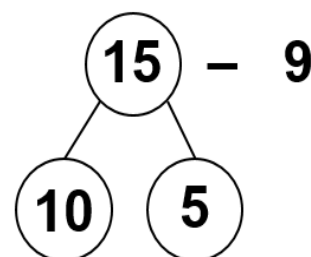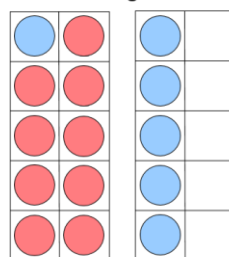0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

- **Tens frame, number line, part-part whole model** for adding and subtraction across 10

Method 1
Subtracting through 10

Method 2
Subtracting from 10

15 – 9

15 – 9

10　　5

– 4　　　　– 5

6　7　8　9　10　11　12　13　14　15
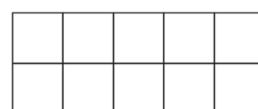
7 + 5 = 7 + 3 + 2 = 10 + 2

- **Dienes or part/part whole,** to add and subtract using related facts
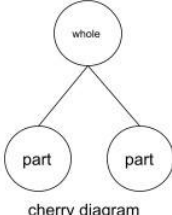
$7 - 4 = 3$

$70 - 40$

$4 + 3 = 7$

$40 + 30$

$3 + 6 = 9$ $23 + 6 = 29$

Domain: **Addition and subtraction (written methods)**

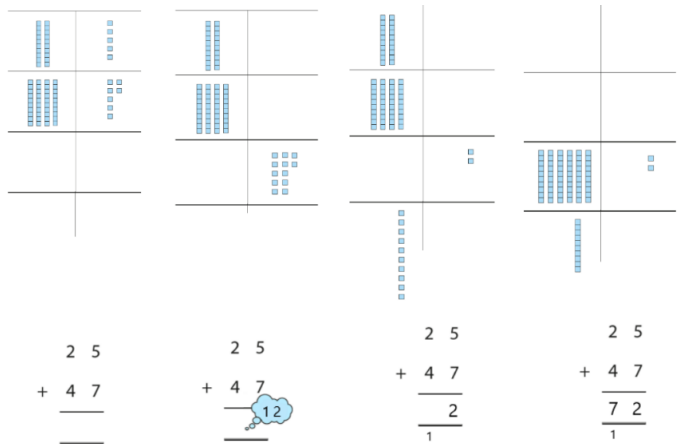| Revision year 1:	New learning- KPIs:	Resources to support learning:	Common misconceptions:
I can compare, describe and solve practical problems for: **lengths and heights [for example, long/short, longer/shorter, tall/short, double/half]** **I can measure and begin to record the following: lengths and heights**	**I can recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value** **I can find different combinations of coins that equal the same amounts of money** **I can solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change**	**Dienes** to support children to understand regrouping e.g. 10 ones becoming 1 ten	- Understanding how to count on or count back on a number line, which number to start with - Understanding of < > = signs - Understanding 100p = £1 - Identifying that there are set coins and their value - Pupils who lose sight of the context and forget which coins we don't have (e.g. when finding ways to make 13p write "10p + 3p")

Place value counters to practise the skill of adding and subtracting

Tens frame to support children in understanding how to bridge through 10

Measuring scales to compare different weights and in addition lessons where the context of measure is used

Measuring jug to compare different measures of capacity and in addition lessons where the context of measure is used
multiple of…

+

Place Value Arrow cards identify how digits change in addition and what this looks like when the number is blended back together

Ruler to compare different measures of length and in addition lessons where the context of measure is used

Visualisation and context:
- **Money** as a real-life context for adding and subtracting (£ and p amounts **not decimal numbers**)

cherry diagram

- **Part whole model** to show partitioning in a standard and non-standard way
- **Bar model** to model the partitioning of numbers

40	20	5	3

- **Online dienes alongside** column method to show regrouping

```
   2  5          2  5          2  5          2  5
+  4  7       +  4  7       +  4  7       +  4  7
--------      --------      --------      --------
                (12)            2            7  2
                                1            1
```

- **Number line** for written method

£26   £37   = £63

26 + 37 = 26 + 30 + 7 = 63


```
        + 30                    + 7
```
26   56   60   63
```
        + 4    + 3
```

```
      − 7              − 20
```
59 − 27 = 32

  20   7

32   39   59
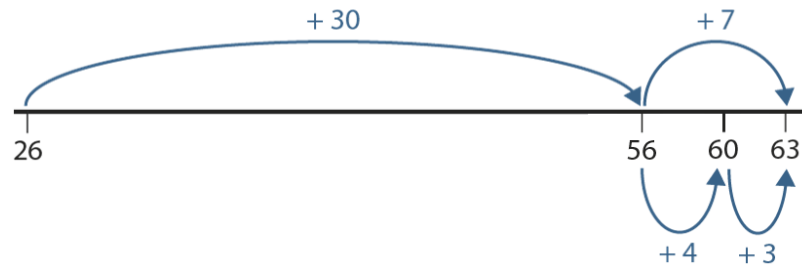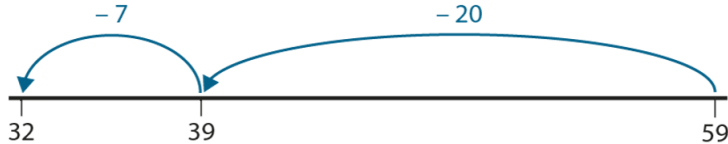
- **Dienes** for representation of 2digit + 2digit and 2digit – 2digit

40 + 20 + 5 + 3 = 68

+ + +

60 + 8 = 68

45 – 20 – 3 = 22

Vocabulary:

Addition:

8 + 3 = 11
Addend Addend Sum

8 - 3 = 5
Minuend Subtrahend Difference

add, addition, more, plus, make, sum, total, altogether, 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…?
subtract, subtraction, take (away), minus, leave, difference, one less, two less… ten less… one hundred less
How many are left/left over how many fewer is… than…? How much less is…?
difference between, half, halve
equals, sign, is the same as
tens boundary, unitise

Lengths, heights, long, short, longer, shorter, tall, short, double, half, metre stick, centimetre, metre, compare, order
Pounds, pence, money, how much more, how much less,

Domain: **Multiplication and division**

Revision year 1:

- I can count forwards and backwards in multiples of 2, 5 and 10, up to 10 multiples, beginning with any multiple, and count forwards and backwards through the odd numbers.
- **I can count in multiples of twos, fives and tens (NPV NC statement)**
- **I can solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.**

New learning- KPIs:

- I can recognise repeated addition contexts, representing them with multiplication equations and calculating the product, within the 2, 5 and 10 multiplication tables.
- I can relate grouping problems where the number of groups is unknown to multiplication equations with a missing factor, and to division equations (quotitive division).
- **I can count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backwards**
- **I can recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables including recognising odd and even numbers**
- **I can calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs**
- **I can show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot**
- **I can solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.**

Visualisation and context:

- **Place value counters** to arrays for multiplication to model the **distributive** law
- **Part whole** to support with application of the **distributive** law
- **1, 10, 5 derive** to find unknown multiplication facts
- **Repeated addition**
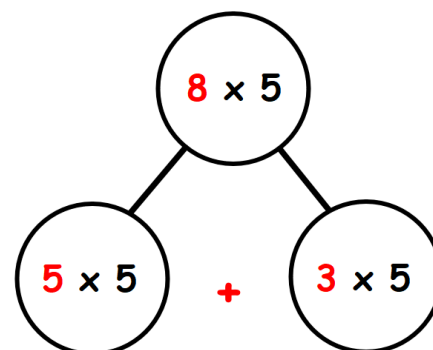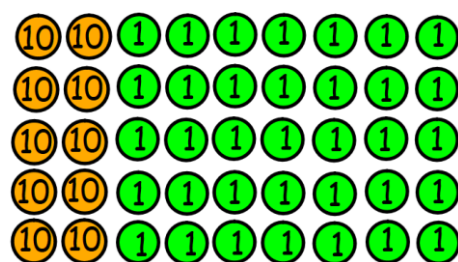
Resources to support learning:

Times table flash cards/ playing cards for rapid recall games
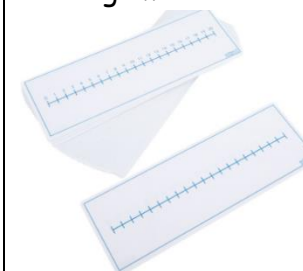
Double sided number line whiteboards to show the relationship between multiplication families

Red and yellow counting stick to count up in multiples of and to help children identify patterns in times table families

Magnetic bar model set to show how many equal groups fit into a whole

Place value counters for children who need to build arrays or to show 'groups of' in division

Common misconceptions:

- Unable to count in 2s, 5s and 10s and use to count a collection of objects efficiently to solve a problem.
- Unable to spot patterns in multiples – therefore won't be able to generalise or predict.
- Confusion over "number of groups" and "group size".

| 7 | 7 | 7 | 7 | 7 |

7 + 7 + 7 + 7 +7 – repeated addition

$2 \times 1 = 2$ $2 \times 2 = 4$ $2 \times 3 = 6$ $2 \times 4 = 8$
$1 \times 2 = 2$ $2 \times 2 = 4$ $3 \times 2 = 6$ $4 \times 2 = 8$
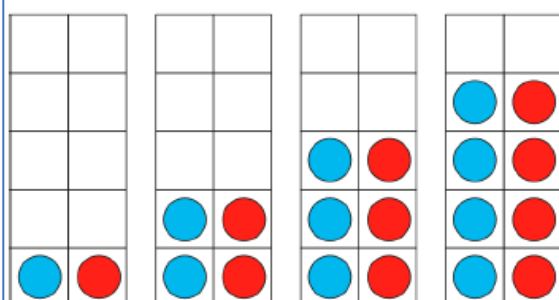
$1 + 1 = 2$ $2 + 2 = 4$ $3 + 3 = 6$ $4 + 4 = 8$

- 'One, two times is the same as double one.'
- 'Two, two times is the same as double two.'
- 'Three, two times is the same as double three.'
- 'Four, two times is the same as double four.'

tens frame
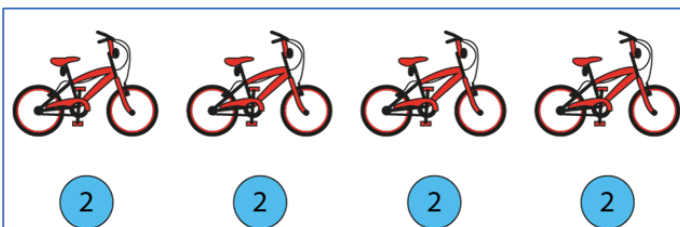
$4 \times 2 = 8$
$8 = 4 \times 2$

pictorials

$2 \times 3 = 6$
$3 \times 2 = 6$ $3 + 3 = 6$

- 'There are two groups of three.'
- 'There are three, two times.'
- 'This is the same as double three.'

relationship betweeen + and x

Sliding place value charts when teaching how numbers change when multiplying and dividing by powers of 10

Numberlink boards to make connections between multiplication families

Place value counters for children to build long multiplication arrays and to apply the distributive law

Vocabulary
lots of, groups of, times, multiply, multiplication, multiplied by, multiple of, product
once, twice, three times… ten times…times as (big, long, wide… and so on),repeated addition, array, row, column, double, halve, share, share equally, one each, two each, three each…group in pairs, threes… tens, equal groups of, divide, division, divided by, divided into, left, left over,

Phase 3

Domain: **Fractions**			
Revision year 1: • I can recognise, find and name a half as one of two equal parts of an object, shape or quantity • I can recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.	**New learning- KPIs:** • I can recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity • I can write simple fractions, for example $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$	**Resources to support learning:** **Fraction walls** to identify equivalent fractions	**Misconceptions:** • Unable to explain and prove that fractions of a shape must be equal in size. • Inaccurate placing of known fractions on a number line.
	Visualisation and context: • **Shapes** divided into halves, quarters, thirds, • **Number line** to show counting up in halves, quarters, thirds 	 **Cuisenaire rods** to identify and build fraction families **Pattern blocks** to support with teaching equivalent fractions **Red and yellow counters** to teach fractions of amount	

Vocabulary:
Fraction, Numerator, Denominator
part, equal parts, fraction, one whole, one half, two halves
one quarter, two… three… four quarters, one third, two thirds, three thirds, equivalent, share

Domain: Geometry

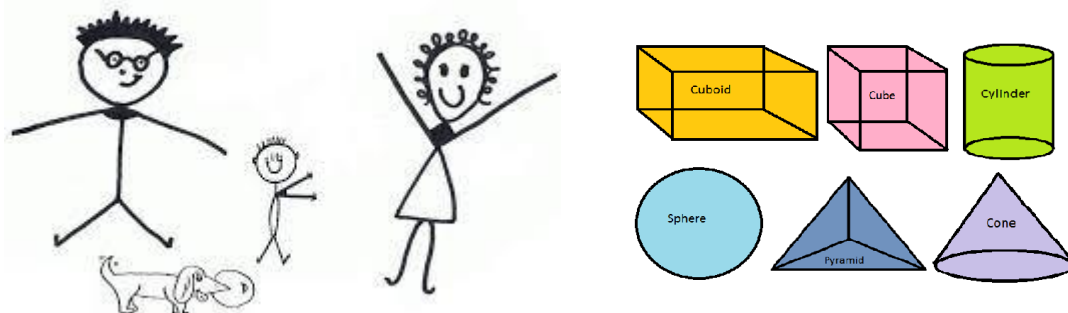| Revision from year 2:	New learning- KPIs:	Resources to support learning:	Misconceptions:
• I can recognise common 2D and 3D shapes presented in different orientations, and know that rectangles, triangles, cuboids and pyramids are not always similar to one another. • I can compose 2D and 3D shapes from smaller shapes to match an example, including manipulating shapes to place them in particular orientations. • **I can recognise and name common 2-D and 3-D shapes, including: 2-D shapes [for example, rectangles (including squares), circles and triangles] 3-D shapes [for example, cuboids (including cubes), pyramids and spheres].** • **I can describe position, direction and movement, including whole, half, quarter and three quarter turns.** •	• I can Use precise language to describe the properties of 2D and 3D shapes, and compare shapes by reasoning about similarities and differences in properties. • **I can identify and describe the properties of 2-D shapes, including the number of sides, and line symmetry in a vertical line** • **I can identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces** • **I can identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid]** • **I can compare and sort common 2-D and 3-D shapes and everyday objects** • **I can order and arrange combinations of mathematical objects in patterns and sequences** • **I can use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise)**

Folding plastic geometric shapes to support children with classification of 3D shapes and to understand nets | • Confusion between vertex, vertices, edges and faces |

Visualisation and context:
- **Angle family** to support with identifying different types of angles in shapes
- **2D images** of 3D shapes to support with classification and description of 3D shapes

Vocabulary:

Pattern, sequence, movement, rotation, straight line, ninety-degree turn, right angle, quarter angle, quarter turn, half tern, three quarter turn, clockwise, anticlockwise, forwards, backwards, left, right, north, south, east, west, compass

Two dimensional, three dimensional, flat, solid, corner, vertex, vertices, side, edge, face, curved, straight, round, line of symmetry, vertical, pattern
Triangle, rectangle, circle, pentagon, hexagon, quadrilateral, cone, cuboid, sphere, cylinder, triangular prism, square based pyramid, cube

Domain: Statistics and Measurement

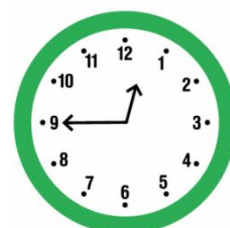| Revision from year 2:	New learning-KPIs:	Resources to support learning:	Misconceptions:
• I can compare, describe and solve practical problems for: • I can mass/weight [for example, heavy/light, heavier than, lighter than] • I can capacity and volume [for example, full/empty, more than, less than, half, half full, quarter] • time [for example, quicker, slower, earlier, later] • I can mass/weight capacity and volume • time (hours, minutes, seconds) • I can recognise and know the value of different denominations of coins and notes • I can sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening] • I can recognise and use language relating to dates, including days of	**Statistics** • I can interpret and construct simple pictograms, tally charts, block diagrams and tables • I can ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity • I can ask-and-answer questions about totalling and comparing categorical data **Measurement** • I can choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels • I can compare and order lengths, mass, volume/capacity and record the results using >, < and = • I can compare and sequence intervals of time • I can tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times • I know the number of minutes in an hour and the number of hours in a day **Visualisation and context:** • Pictograms, tally charts, bar graph, Calendars • 12- hour clocks	Plastic clocks to teach children how to read the time Number lines with intervals of 5 to 60 to represent the 12-hour clock as a more familiar number line structure	• Reading the time and confusing the minute and hour hand • Incorrect "tallying" – e.g. more/ less than 5 in each tally. • Reading the graph incorrectly to determine what it is showing. • Unable to recognise what an amount may be if it falls between two numbered intervals- odd numbers on a scale of 2s. • Recognising the worth of a picture on a pictogram- especially when more than one. • Knowing half a picture on a pictogram represents half of the amount

the week, weeks, months and years
- **I can tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.**

Monday

Tuesday

Wednesday

Thursday

Friday

Saturday

Sunday

= 6 cupcakes

DECEMBER 2022

Sun	Mon	Tue	Wed	Thu	Fri	Sat
27	28	29	30	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

Vocabulary:

Heavy, light, heavier than, lighter,

full, empty, more than, less than, half full, quarter full, capacity, volume, millilitre, litre, temperature, Celsius, degrees, gram, kilogram,

Time, quicker, slower, earlier, later, clock, hours, minutes, seconds, hand, O'clock, half past, quarter past, quarter to, five minutes, duration, intervals, shorter, longer

Data, interpret, key, tally chart, pictogram, block graph, table, total, compare, symbol, most popular, least popular, difference between, axis title, horizontal, vertical, survey