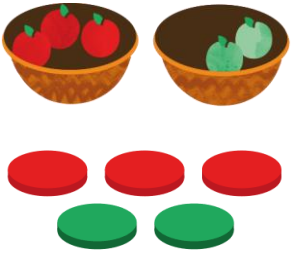
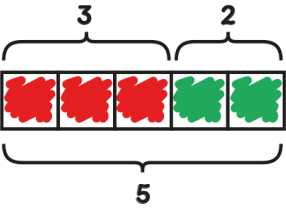


# MATHEMATICS - CPA

Across the Federation, we use a **CPA** (concrete, pictorial, abstract) approach to teach mathematical fluency.

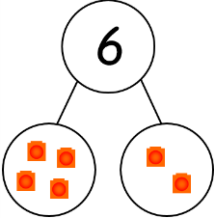
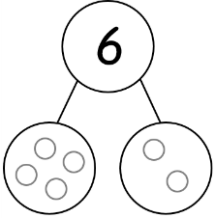
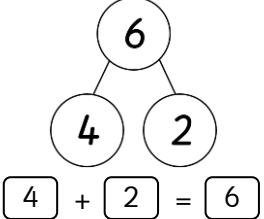
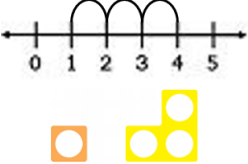
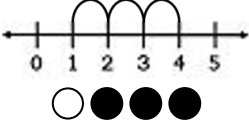
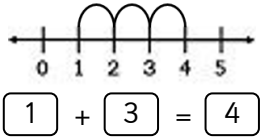
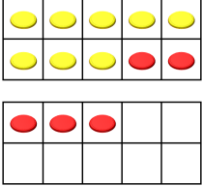
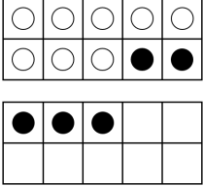
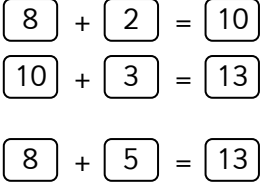
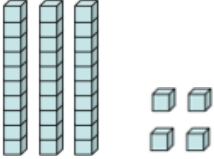
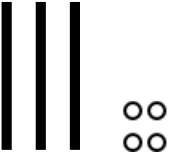

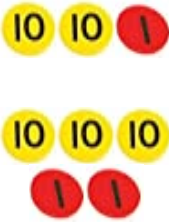
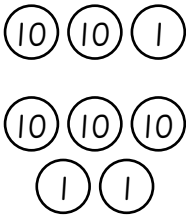
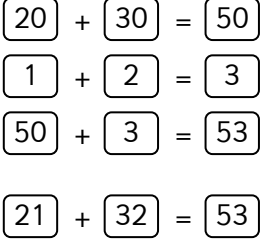
Children are introduced to new mathematical concepts through the use of **concrete** objects (e.g. counters). They then explore concepts **pictorially** (usually representations of the concrete objects they have used) and finally, they solve problems where they only have the **abstract** (i.e. numbers and symbols). Building these steps helps children secure their understanding by seeing the relationship between numbers and the real world.

Concrete	Pictorial	Abstract
		$3 + 2 = \boxed{5}$

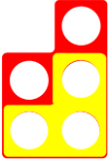

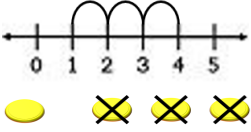
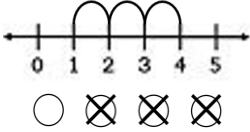
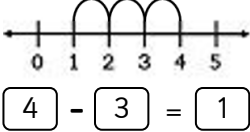
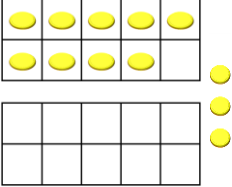
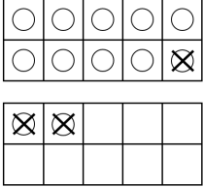
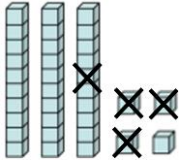
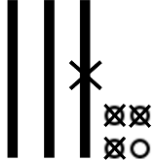

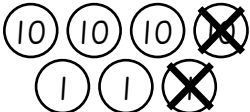
Teachers will post their **Maths Working Walls** each week on Class Dojo. This will show what your child has learned in mathematics at school that week and will also show the strategies used to teach different mathematical concepts. Understandably, it is really important that the strategies used at home are the same as the strategies that we use in school.

Outlined on the pages that follow are some of the approaches and resources that we use to teach addition, subtraction, multiplication and division.

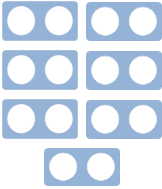
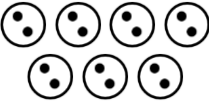
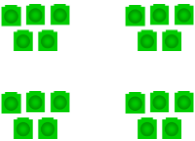
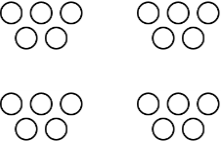
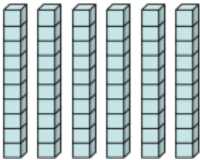
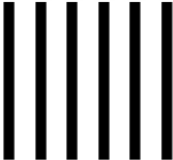

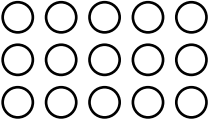
# KS1 ADDITION

+	Concrete	Pictorial	Abstract
Part Whole Models			 $4 + 2 = 6$
Number lines			 $1 + 3 = 4$
Ten Frames			 $8 + 2 = 10$ $10 + 3 = 13$ $8 + 5 = 13$
Base-ten blocks			 $30 + 4 = 34$
Place Value Counters			 $20 + 30 = 50$ $1 + 2 = 3$ $50 + 3 = 53$ $21 + 32 = 53$

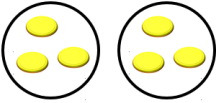
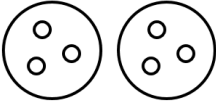
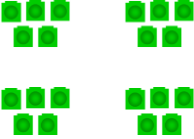
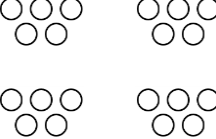
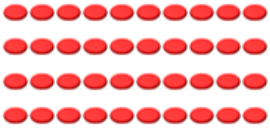

# KS1 SUBTRACTION

I	Concrete	Pictorial	Abstract
Numicon			$\boxed{5} - \boxed{3} = \boxed{2}$
Number lines			
Ten Frames			$\boxed{12} - \boxed{3} = \boxed{9}$
Base-ten blocks			$\boxed{34} - \boxed{13} = \boxed{21}$
Place Value Counters			$\boxed{40} - \boxed{10} = \boxed{30}$ $\boxed{3} - \boxed{1} = \boxed{2}$ $\boxed{43} - \boxed{11} = \boxed{32}$

# KS1 MULTIPLICATION

✖	Concrete	Pictorial	Abstract
Numicon			$\boxed{7} \times \boxed{2} = \boxed{14}$
Cubes			$\boxed{4} \times \boxed{5} = \boxed{20}$
Base-ten blocks			$\boxed{6} \times \boxed{10} = \boxed{60}$
Arrays			$\boxed{3} \times \boxed{5} = \boxed{15}$

# KS1 DIVISION

÷	Concrete	Pictorial	Abstract
Sharing			$\boxed{6} \div \boxed{2} = \boxed{3}$
Grouping			$\boxed{20} \div \boxed{5} = \boxed{4}$
Arrays			$\boxed{40} \div \boxed{10} = \boxed{4}$

# MATHS VOCABULARY – YEAR 1

<b>Capacity</b>	The amount of space inside an object (the amount of liquid or air it contains).
<b>Difference</b>	By how much a number is bigger or smaller than another (e.g. the difference between 4 and 6 is 2).
<b>Digit</b>	Any single number from 0 to 9 (inclusive).
<b>Edge</b>	The intersection of two faces (the line along which they join) of a three-dimensional shape.
<b>Even number</b>	A positive or negative number exactly divisible by 2.
<b>Face</b>	A plane (flat) surface of a three-dimensional object.
<b>Greater than</b>	The symbol used to represent greater than is an arrow pointing towards the smallest number (e.g. 6 is greater than 2 is $6 > 2$ ).
<b>Hexagon</b>	A polygon (2 d shape) with six sides.
<b>Half</b>	The part of a shape (or number) when divided exactly into 2 equal parts.
<b>Less than</b>	The symbol used to represent less than is an arrow pointing towards the smallest number (e.g. 1 is smaller than 4 is $1 < 4$ ).
<b>Oblong</b>	A shape with two pairs of straight, unequal sides and four right angles (also known as a rectangle).
<b>Odd number</b>	A number that when divided by two leaves a remainder of one.
<b>Ordinal number</b>	Describes a position in a number sequence.
<b>Place value</b>	Indicates the value of a digit (the amount it is worth) e.g. the place value of the 3 in 32 is 30.
<b>Sum</b>	The result when two or more numbers are added together.

# MATHS VOCABULARY – YEAR 2

<b>Decrease</b>	To make smaller (take away) or a pattern of numbers that is getting smaller.
<b>Horizontal</b>	Describes a line or plane parallel to the Earth's surface.
<b>Irregular shapes</b>	Shapes do not have sides of equal length or equal angles.
<b>Increase</b>	To make larger (add to) or a pattern of numbers that is getting larger.
<b>Kite</b>	A quadrilateral that has two adjacent pairs of sides that are equal in length, and at least one pair of opposite angles are equal.
<b>Line of symmetry</b>	A line that divides a shape into equal halves.
<b>Multiple</b>	The product of a given number with another factor.
<b>Octagon</b>	A polygon (2D shape) with eight sides and eight angles.
<b>Regular shape</b>	A shape with equal sides and angles.
<b>Vertical</b>	A line that is perpendicular (at a right angle to the horizontal).

# MATHS VOCABULARY – YEAR 3

<b>Acute</b>	Describes angles between 0 and 90 degrees.
<b>Alternate</b>	Every other one in a sequence.
<b>Angle</b>	The number of degrees rotated around a point.
<b>Ascending order</b>	The arrangement of numbers from smallest to largest.
<b>Axis of symmetry</b>	A line dividing a shape into two symmetrical parts.
<b>Base</b>	The line or face on which a shape is standing.
<b>Breadth</b>	Another name for width - the distance across from side to side.
<b>Denominator</b>	The number below the line in a fraction.
<b>Descending order</b>	The arrangement of numbers from the largest to smallest.
<b>Diagonal</b>	A straight line connecting 2 non-adjacent vertices of a polygon.
<b>Dimensions</b>	The measurements of a shape (i.e. length, width, height).
<b>Heptagon</b>	A 2D shape, also called a septagon, with 7 sides and 7 angles.
<b>Interior</b>	Another word for 'inside'.
<b>Isosceles triangle</b>	A triangle which has two sides of equal length.
<b>Numerator</b>	The number above the line in a fraction.
<b>Obtuse angle</b>	An angle between 90 and 180 degrees.
<b>Parallelogram</b>	Quadrilateral with 2 pairs of parallel lines & equal opposite angles.
<b>Perimeter</b>	The length of the distance around the boundary of a shape.
<b>Perpendicular line</b>	A line at right angles to another line or plane.
<b>Product</b>	The result when two or more numbers are multiplied.
<b>Quadrilateral</b>	A four sided shape.
<b>Quarter</b>	A shape or number divided in to 4 equal parts.
<b>Rhombus</b>	A parallelogram with congruent (equal) sides. Opposite sides are parallel and opposite angles are equal in size.
<b>Roman numerals</b>	Seven letters are used in combination to write numbers: <b>I</b> = 1, <b>V</b> = 5, <b>X</b> = 10, <b>L</b> = 50, <b>C</b> = 100, <b>D</b> = 500 & <b>M</b> = 1000
<b>Rounding</b>	An approximation used to express a number more conveniently.
<b>Scale</b>	A series of regular marks along a line used to measure or count.
<b>Trapezium</b>	A quadrilateral with two parallel sides.



# MATHS VOCABULARY – YEAR 4

<b>Area</b>	The amount of space within a perimeter (expressed in square units).
<b>Coordinates</b>	Numbers used to locate a point on a grid.
<b>Equilateral triangle</b>	A triangle with equal angles and equal sides.
<b>Factor</b>	A number which will divide exactly into another number.
<b>Isosceles triangle</b>	A triangle with two equal sides and two equal angles.
<b>Improper fraction</b>	A fraction with a numerator greater than its denominator.
<b>Quadrant</b>	A quarter of the area of a circle, containing a right angle.
<b>Scalene triangle</b>	A triangle with three unequal side lengths and no equal angles.
<b>Translation</b>	When a shape is moved from one place to another just by sliding it (without rotating, reflecting or enlarging).

# MATHS VOCABULARY – YEAR 5

<b>Adjacent</b>	Adjoining (as used to describe lines and angles).
<b>Average</b>	A number representing a set of numbers (obtained by dividing the total of the numbers by the numbers itself).
<b>Carroll Diagram</b>	A problem-solving diagram used in classification activities.
<b>Composite number</b>	A number with more than two factors.
<b>Integer</b>	A negative or positive whole number.
<b>Polyhedron</b>	A three dimensional shape with plane faces.
<b>Prime number</b>	A number with only 1 and itself as factors (e.g. 2, 3, 5, 7, 11 etc.).
<b>Quotient</b>	The result when one number is divided by another number.
<b>Reflex angle</b>	An angle greater than 180 degrees.
<b>Rotational symmetry</b>	A shape is said to have rotational symmetry if it looks the same in different positions when rotated about its centre.
<b>Squared</b>	A number squared is a number multiplied by itself.
<b>Square number</b>	A number whose units can be arranged into a square (e.g. 1, 4, 9, 16, 25, 36, 49, 64 etc.).

# MATHS VOCABULARY – YEAR 6

<b>Algebra</b>	Letters are used to represent numbers and quantities.
<b>Bisect</b>	To divide into two equal parts.
<b>Circumference</b>	The distance around a circle (its perimeter).
<b>Congruent</b>	Congruent shapes are the same shape and size
<b>Dodecagon</b>	A twelve sided polygon.
<b>Equation</b>	A statement of equality between two expressions (e.g. $3 \times 4 = 6 + 6$ ).
<b>Mean</b>	The average of a set of numbers. The sum of the values in a set of data divided by the total number of items in that set.
<b>Tessellation</b>	Shapes fitted together with a number of exact copies and with no overlaps or gaps.
<b>Triangular number</b>	A number whose units can be arranged into a triangle (e.g. 1, 3, 6, 10, 15, 21...)

# MATHEMATICS TABLES – PART 1

x	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

<b>Number</b>	1	2	3	4	5	6	7	8	9	10	11	12
<b>Square</b>	1	4	9	16	25	36	49	64	81	100	121	132
<b>Cube</b>	1	8	27	64	125	216	343	512	729	1000	1331	1728

## Multiplying and Dividing by 10, 100 and 1000

<b>10,000</b>	<b>1000</b>	<b>100</b>	<b>10</b>	<b>1</b>	●	<b>1/10</b>	<b>1/100</b>	<b>1/1000</b>
					●			

### Multiplying

**x10** digits move **left 1** space  
**x100** digits move **left 2** spaces  
**x1000** digits move **left 3** spaces


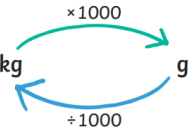

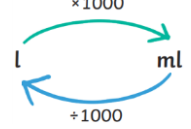

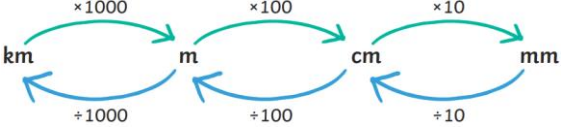


### Dividing

$\div 10$  digits move **right 1** space  
 $\div 100$  digits move **right 2** spaces  
 $\div 1000$  digits move **right 3** spaces



# MATHEMATICS TABLES – PART 2

Converting Mass		Converting Capacity	
 	$1000\text{g} = 1\text{kg}$	 	$1000\text{ml} = 1\text{ litre}$
	$\frac{1}{10}\text{kg} = 0.1\text{kg} = 100\text{g}$		$\frac{1}{10}\text{l} = 0.1\text{l} = 100\text{ml}$
	$\frac{1}{4}\text{kg} = 0.25\text{kg} = 250\text{g}$		$\frac{1}{4}\text{l} = 0.25\text{l} = 250\text{ml}$
	$\frac{1}{2}\text{kg} = 0.5\text{kg} = 500\text{g}$		$\frac{1}{2}\text{l} = 0.5\text{l} = 500\text{ml}$
	$\frac{3}{4}\text{kg} = 0.75\text{kg} = 750\text{g}$		$\frac{3}{4}\text{l} = 0.75\text{l} = 750\text{ml}$
	$\frac{3}{4}\text{kg} = 0.75\text{kg} = 750\text{g}$		$\frac{1}{100}\text{l} = 0.01\text{l} = 10\text{ml}$
Converting Length			
			
	$1000\text{ metres} = 1\text{ kilometre}$	$\frac{1}{4}\text{ km} = 0.25\text{km} = 250\text{m}$	
	$100\text{cm} = 1\text{m}$	$\frac{1}{2}\text{ km} = 0.5\text{km} = 500\text{m}$	
	$10\text{mm} = 1\text{cm}$	$\frac{3}{4}\text{ km} = 0.75\text{km} = 750\text{m}$	
	$\frac{1}{10}\text{ km} = 0.1\text{km} = 100\text{m}$		

Percentage	Fraction	Decimal
100%	1	1
75%	$\frac{3}{4}$	0.75
66.6%	$\frac{2}{3}$	0.66666 recurring
50%	$\frac{1}{2}$	0.5
33.3%	$\frac{1}{3}$	0.33333 recurring
25%	$\frac{1}{4}$	0.25
20%	$\frac{1}{5}$ or $\frac{2}{10}$	0.2
12.5%	$\frac{1}{8}$	0.125
10%	$\frac{1}{10}$	0.1
5%	$\frac{1}{20}$ or $\frac{5}{100}$	0.05
1%	$\frac{1}{100}$	0.01