Mathematical vocabulary that all children should know, understand and be able to use by the end of Year 6

In order to achieve this aim:

- key mathematical vocabulary must be explicitly taught to children and used consistently

- standard definitions / explanations should be used across the school to avoid confusion / mis-conceptions developing, particularly as children move into a new year group.

Third Space Learning suggests:

1. Define mathematical vocabulary in every lesson alongside pictorial representations
2. Link language back to prior learning on topics in previous year groups
3. Explain synonyms, comparative and superlative terms and use them interchangeably on a regular basis
4. Avoid use of everyday language (eg don't say borrow or take, say exchange)
5. Explain the connotations specific terms have (eg 'change' means subtraction is needed)
6. Provide opportunities for children to reason in every lesson, both verbally and in writing
7. Structure our questioning so that it provokes thought and use of key terms in response (eg Sam thinks … Is he correct? Why?)

Numerical Reasoning

Key Terminology	Definition
Number	A count or measure
Numeral	How we write a number
Digit	Any numeral from 0 to 9 (inclusive). Eg the numeral 152 has three digits
Integer	A negative or positive whole number
Cardinal number	Shows quantity but not order, ie how many of something there are
Ordinal number	Describes a position in a number sequence eg 1^{st}, 2^{nd}, 3^{rd}, …
Whole number	A number without fractions or decimals
Positive number	A number greater than zero
Negative number	A number less than zero
Odd number	A number not exactly divisible by 2. KS1 – A number that cannot be divided into 2 equal groups.
Even number	A number exactly divisible by 2. KS1 - A number that can be divided into 2 equal groups.
Prime number	A number with only two factors, 1 and itself (e.g. 2,3,5,7,11, 13, 17, 19, 23…)
Composite number	A number with more than two factors
Factor	Numbers which divide exactly into another number. Eg 1, 2, 3, 6 are the factors of 6.
Consecutive	Consecutive numbers follow in order without interruption (e.g. 2,3,4,5)
Alternate	Every other one in a sequence
Sequence	A list (usually numbers) in order

Ascending order	The arrangement of numbers from smallest to largest
Descending order	The arrangement of numbers from largest to smallest
Greater than	A comparison >
Less than	A comparison <
Equal	same, same as, equivalent, equal to, balanced NOT the answer, makes, total
Unequal	≠
Estimate	A sensible guess
Digit value	The numeral itself despite its position in a number (e.g. the digit value of 8 in 38,250 is 8)
Place value	Indicates the position of a digit (e.g. the place value of the 3 in 738 is 30)
Partition	Breaking a number into two or more parts (not just into tens and ones) eg 27 is 20 and 7 or 10 and 10 and 5 and 2; 6 is 5 and 1or 4 and 2, etc
Rounding	The process of simplifying a number to the nearest whole number or the nearest ten, hundred, thousand, etc If the final digit is 1,2,3,4 round down. If the final digit is 5,6,7,8,9 round up
Roman numerals	Seven letters used in combination to write numbers: I = 1 V = 5 X = 10 L = 50 C = 100 D = 500 M = 1000
Squared	A number squared is a number multiplied by itself
Cubed	A number cubed is a number multiplied by itself three times
Triangular number	A number whose units can be arranged into a triangle (e.g. 1, 3, 6, 10, 15, 21…)
Baker's dozen	The colloquial name given to the number 13

Additive Reasoning

Key Terminology	Synonyms
+	add, altogether, total, increase, more, more than, plus, combine, put in, sum, and, how much larger? how much / many more?
−	take, take away, subtract, minus, less, less than, lower than, difference, difference between, change, decrease, how much / many left? how much smaller is …?
=	same, same as, equivalent, equal to, balanced NOT the answer, makes, total
	Definition
Augend	The number to which another is added (the first number in a number sentence)
Addend	A number which is added to another (the second or subsequent number in a number sentence)
Minuend	A quantity or number from which another is to be subtracted (the first number in a number sentence)
Subtrahend	A quantity or number to be subtracted from another (the second number in a number sentence)

Additive and Multiplicative Reasoning

Key Terminology	Synonyms
Equation	A statement of equality e.g. 3+2=5, 8 + 4 = 6 + 6; 3x2=6, 8 x 4 = 16 x 2
Operation	A mathematical process – add, subtract, multiply, divide, squared, cubed
Inverse	Opposite
Commutative law	When adding or multiplying you can swap numbers around and still get the same answer
Associative law	When adding or multiplying 3 or more numbers you can add / multiply the numbers in any order and still get the same answer

Multiplicative Reasoning

Key Terminology	Synonyms and key words/ phrases
✖	multiply, times, product, area, total, multiple, times larger, scale
÷	divide, share equally, half, times smaller, each, factors, mean, scale, times smaller, how many groups? how much does one cost?
	Definition
Factor	Numbers which divide exactly into another number. Eg 1, 2, 3, 6 are the factors of 6
Multiple	The result of multiplying a number by an integer
Multiplier	A quantity by which a given number (the multiplicand) is to be multiplied
Multiplicand	A quantity which is to be multiplied by another (the multiplier)
Product	The result when two or more numbers are multiplied.
Dividend	A quantity to be divided by another number
Divisor	A number that divides an integer
Quotient	The result when one number is divided by another number.
Remainder	The amount left over after a division happens when the dividend does not divide exactly by the divisor
Squared	A number squared is a number multiplied by itself.
Distributive law	Multiplying a number by a group of numbers added together is the same as doing each multiplication separately eg 3 x 24 = 3 x 20 + 3 x 4

Fractions

Key Terminology	Definition
Fraction	Part of a whole
Denominator	The number below the line (vinculum) in a fraction denoting how many parts the whole has been divided into
Numerator	The number above the line (vinculum) in a fraction denoting how many parts you have
Vinculum	The line separating the numerator and the denominator – meaning 'divided by'
Improper fraction	A fraction with a numerator equal to or greater than its denominator
Mixed number	A whole number and a fraction combined
Unitary fraction	A fraction with a numerator of 1
Decimal fraction	A fraction with a denominator that is a multiple of 10
Simplify (fractions)	The process of reducing the numerator and denominator to their smallest whole numbers so the fraction is in its simplest form
Per cent	Out of one hundred
Ratio	A ratio compares value. It says how much of one thing there is compared to another
Proportion	A proportion tells us how many of one thing there is out of the whole set
Scale Factor	Describes the size of an enlargement or reduction
Scale up	An increase according to a fixed ratio
Scale down	A decrease according to a fixed ratio

Geometrical Reasoning

Key Terminology	Definition
Angle	A measure of turn
Degree	The unit of measure for angles
Acute	An angle between 0 and 90 degrees
Right Angle	An angle equal to 90 degrees
Obtuse angle	An angle between 90 and 180 degrees
Straight line	An angle equal to 180 degrees
Reflex angle	An angle greater than 180 degrees
Full turn/ full rotation	An angle equal to 360 degrees
Interior angle	The angles inside a shape
Exterior angle	The angle between any side of a shape, and a line extended from the next side
2d Shape	A plane (flat) shape – it has length and breadth but NOT depth
3d Shape	A shape with 3 dimensions – length, breadth and depth
Base	The line or face on which a shape is standing
Edge	The line where two faces meet
Face	A plane (flat) or curved surface on a three-dimensional shape
Plane	A flat surface with no thickness
Polygon	A plane (2d) closed shape with three or more straight sides
Polyhedron	A three dimensional shape with plane faces

Vertex / Vertices	The point where two or more edges meet
Apex	An apex is the highest point of a shape. The apex is a vertex where two or more sides meet, and it is located directly above the base of the shape
Regular	A shape with equal length sides and angles
Irregular	A shape that is not regular ie not all sides and angles are equal
Congruent	The same shape and size
Tessellation	Shapes fitted together with no overlaps or gaps
Concave	A surface or a line that bends or protrude inwards
Convex	A surface or a line that bends or protrudes outwards
Length	The distance from end to end
Breadth	Breadth is another name for width
Width	The distance across from side to side
Area	The amount of space within a perimeter. Formula for rectangles: A = L x W - expressed in square units
Perimeter	The distance around the boundary of a shape
Circumference	The distance around a circle (its perimeter). Formula: $C = \pi D$
Radius	The distance from the edge to the mid-point of a circle
Dimensions	The measurements of a shape (i.e. length, width, height)
Volume	The amount of space taken up by an object. Formula for cuboids: V = L x W x H - expressed in cubic units
Capacity	The amount of a substance a container can hold

Horizontal	A line parallel to the earth's horizon (going side to side)
Vertical	A line which is at right angles to a horizontal line
Diagonal	A straight line connecting two non-adjacent vertices (corners) of a polygon
Oblique	Sloping or slanting. (not necessarily a diagonal)
Parallel lines	Always the same distance apart and never touching
Perpendicular line	A line at right angles to another line
Bisect	To divide into two equal parts
Intersection	The point where two lines meet or cross each other
Quadrant	Any of the four areas created when a 2d shape is divided equally by 2 perpendicular lines
Symmetrical	A shape is symmetrical if it is identical on either side of a line dividing it into two parts
Line or axis of symmetry	A line dividing a shape into two identical parts
Rotational symmetry	The shape looks the same when rotated around a point
Order of symmetry	How many times the shape matches as it is rotated through one complete turn
Translation	A shape is moved by sliding it (no rotating, reflecting or enlarging)
Reflection	An image or shape as it would be seen in a mirror
Coordinates	A pair of numbers used to locate a point on a grid. "Along the corridor and up the stairs."
X Axis	The horizontal axis on a graph
Y Axis	The vertical axis on a graph

Data	A collection of facts such as numbers, measures, observations
Mean	The average of a set of numbers. The sum of the values in the set divided by the total number of items in the set.
Median	The middle value of a set of ordered data.
Mode	The value that occurs the most often in a set of data.
Range	The difference between the biggest and the smallest value in a data set
Tally	A record of items using vertical and oblique lines to represent each item
Metric measure	Modern units of length – based on the decimal system – mm, cm, m, km
Imperial measure	Old units of length – inches, feet, miles

2d shapes	
Triangle	A polygon with 3 sides and 3 angles
Equilateral triangle	A regular triangle
Isosceles triangle	A triangle which has two sides of equal length and two equal angles.
Scalene triangle	A triangle that has three sides of different length and no equal angles.
Quadrilateral	A polygon with four sides and four angles
Square	A regular quadrilateral
Rectangle	A quadrilateral with opposite sides equal and parallel AND four right angles. *NB: A square is an example of a rectangle*
Oblong	A rectangle that is not a square
Kite	A quadrilateral with two adjacent pairs of sides that are equal in length, and at least one pair of opposite angles are equal. *NB: A square is an example of a kite*

Parallelogram	A quadrilateral with opposite sides equal and parallel and the opposite angles are equal in size. *NB: A square is an example of a parallelogram*		
Rhombus	A parallelogram with congruent sides. Opposite sides are parallel and opposite angles are equal. *NB: A square is an example of a rhombus*		
Trapezium	A quadrilateral with one pair of parallel sides		
Pentagon	A polygon with 5 sides and 5 angles	Nonagon	A polygon with 9 sides and 9 angles
Hexagon	A polygon with 6 sides and 6 angles	Decagon	A polygon with 10 sides and 10 angles
Heptagon	A polygon with 7 sides and 7 angles	Hendecagon	A polygon with 11 sides and 11 angles
Octagon	A polygon with 8 sides and 8 angles	Dodecagon	A polygon with 12 sides and 12 angles
Circle	A plane shape. All points around the edge are an equal distance from the centre		
3d shapes			
Prism	A 3d shape with two identical ends. It has the same cross-section all along its length		
Cube	A 3d shape with 6 square faces		
Cuboid	A 3d shape with 6 rectangular faces. (Remember, a square is a regular rectangle – so faces could be square!) *NB: A cube is an example of a cuboid*		
Cylinder	A prism with two circular ends		
Triangular Prism	A prism with two triangular ends		
Pentagonal Prism, etc	A prism with two _____ ends		
Tetrahedron	A polyhedron with four plane faces		
Pyramid	A polyhedron, with any polygon as a base and three or more triangular faces that meet at a point called the apex		
Cone	A 3d shape with a circular base joined to a point with a curved face		

Key models and images

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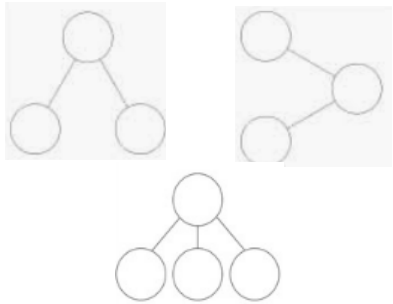
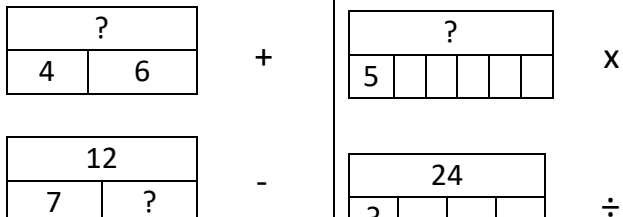
<tr><td> 
</td><td> 
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<tr><td>Ten frame</td><td colspan="2">Unstructured number line</td></tr>
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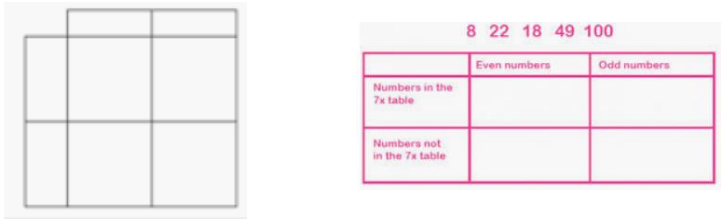
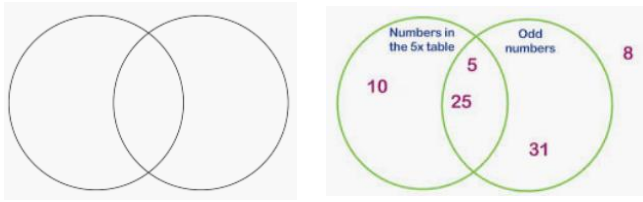
<tr><td>Carroll Diagram</td><td colspan="2">Venn Diagram</td></tr>
<tr><td> 
</td><td colspan="2"> 
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Further reading:

https://thirdspacelearning.com/blog/maths-language-skills/