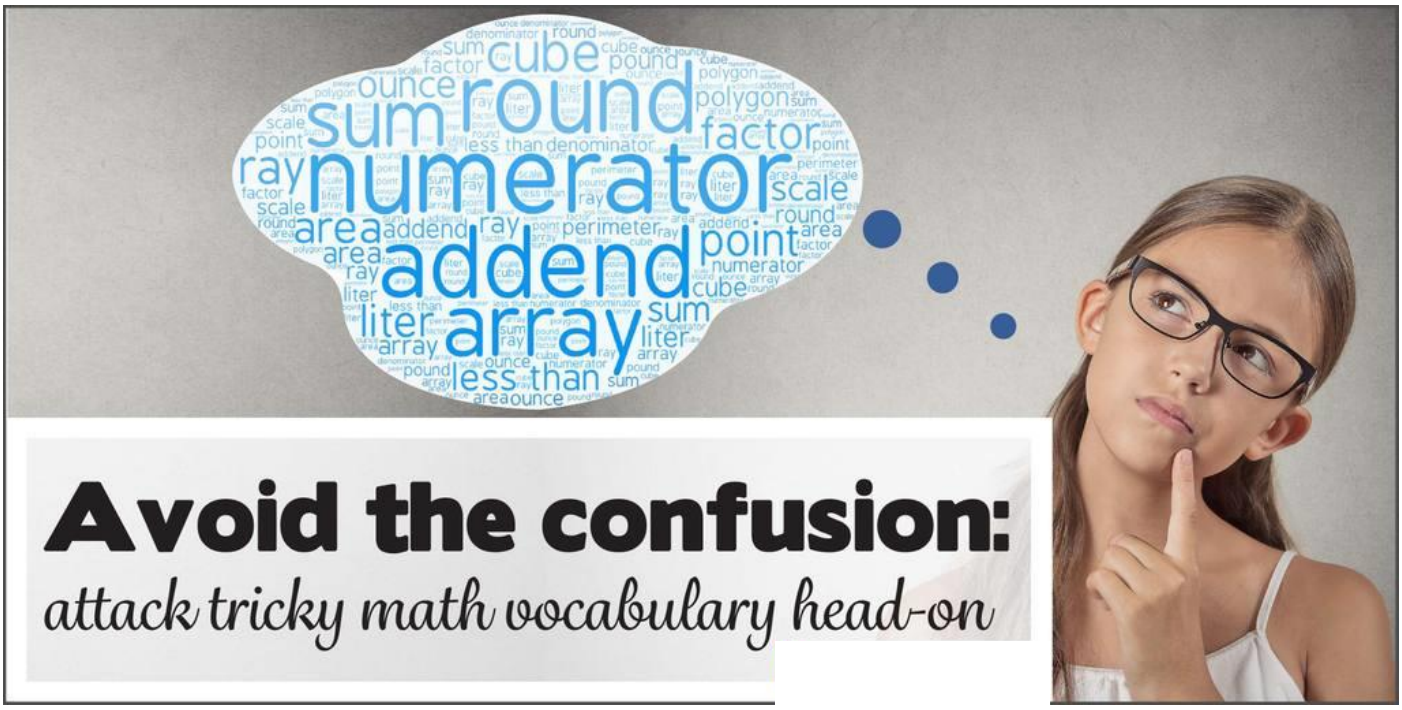
SMSG Maths Vocabulary Guide for Parents



Here is a guide to some of the common maths terms and phrases that are used in school and you may hear your children using:

- **2D shapes** are any flat or 'two-dimensional' shape, such as a square, circle or triangle.
  - **Equilateral Triangle** is a triangle with three equal sides and three equal angles.
  - **Isosceles triangle** is one with two equal sides and two equal angles.
  - **Kite** is a quadrilateral (four-sided shape) with two pairs of adjacent (next-door) sides that are congruent (equal in length). The diagonals of a kite are perpendicular (meet at a right angle).
  - **Polygon** is any 2D shape with straight, closed sides. Any shapes with open or curved sides are not polygons. For example, triangles, squares and parallelograms are polygons, but circles and ovals are not.
  - **Quadrilaterals** are any 2D shape with four sides, including a square, rhombus, kite and trapezium.
  - **Right-angled triangle** is a 2D shape with three sides and one angle that measures 90°.
  - **Scalene triangle** is a 2D three-sided shape where all the sides and angles are unequal.
  - **Triangles** are a 2D shape with three sides, angles and corners.
  - **Vertex** is another name for a corner of a 2D.

- **3D shapes** are 'three-dimensional' and has volume, for an example a cube (cardboard box), pyramid or cylinder (tube).
  - **Edge** is the name for lines created when two faces in a 3D shape meet.
  - **Face** is the flat part of a 3D shape.
  - **Net** is the flat outline of a 3D shape, before it is folded together.
  - **Prisms** are 3D shapes with two identical flat sides and ends. Cubes and cuboids are examples of prisms.
  - **Pyramid** is a 3D shape with triangular sides that join at a point, with a polygon base.
  - **Regular and irregular shapes** - A regular shape is one where all the sides and interior angles are equal, whereas an irregular shape has sides and angles of different lengths and sizes.
  - **Vertex/vertices** are the points where edges in a 3D shape meet.

- **Algebra** is where unknown numbers are represented by letters.

- **Area of a shape, surface, piece of land etc.** means the amount of space it takes up. For example, a rectangular football field has an area of 64m² or 64 squared metres.

- **Arrays** are shapes or objects that are arranged in a rectangle. Teachers use these to help children to see and understand multiplication.

- **Ascending order** means to go up, so numbers given in ascending order are going from smallest to largest. For example, 1, 2, 3, 4, 5, 6 are numbers in ascending order.

- **Averages**, when we talk about averages in everyday life, we are usually referring to the **mean average**. This is the sum of the numbers in a set of data, divided by the number of members of that set. So if we wanted to know the average age of a group of children, we would add up all their ages and divide by the number of children. There are two other types of average that children may come across. They are:
  - **Median average**, this is the number in the middle if you place the numbers in a set in order of size.
  - **Mode average**, this is the most common number in a set, if any of the numbers occur more than once.

- **Axes of a graph or chart** are the horizontal and vertical lines that create it, often known as the x-axis and y-axis.

- **Bar model** is a method that uses diagrams of rectangular bars to represent maths problems in a visual way, making them easier for children to see which operation to use to work out a calculation. Younger children may use cubes to physically represent this.

- **Circumference** is the length around the edge of a circle.

- **Clockwise and anti-clockwise**, to move in a clockwise direction means moving in the same direction as the hands on a clock. If something moves in the opposite direction to the hands of a clock, it is moving in an anticlockwise direction.

- **Coordinates** of a shape or object refer to where on a map or graph they are, by looking at the two axes and recording the numbers they are at. These can be taught with the phrase "along the corridor and up/down the stairs" to refer to looking at the x-axis first then looking at the y-axis.

- **Commutative** is where you can switch the order of the numbers in an addition and multiplication calculation and it will still give you the same answer.

- **Cube numbers** are the result of when a number is multiplied by itself three times. When writing cube numbers, we write a small three above the number, e.g. 3 x 3 x 3 or $3^3 = 27$

- **Data Handling** means using simple lists, tables and graphs to present information.
  - **Bar chart** is a form of graph that displays information using rectangular bars of different heights, according to their numerical value.
  - **Block graph** is a simpler version of a bar chart, but using blocks to represent the data, with each block worth 1 unit.
  - **Carroll diagram** is a way of organising information and grouping according to what criteria it fits into.
  - **Line graph** is one where a line connects points, showing how values change over time. For example, a line graph might show the amount of rainfall over six months.
  - **Pictogram** is a type of graph that uses pictures to represent information. These are often taught in Key Stage 1 before moving onto block charts and bar charts.
  - **Pie chart** is a circular chart divided into sections, representing different values, which can be fractions, decimals, percentages or angles.
  - **Tally charts** uses marks instead of numbers to represent information. One vertical mark is used to represent each one unit, with five being shown as a fifth line crossed through the first four lines.

- **Decimal** is a number that contains tenths, hundredths, thousandths etc, with a decimal point between the ones and tenths. Money is often used to teach decimals. For example, 3.4, 2.18, £56.99

- **Degrees** are the unit of measurement for measuring angles, usually symbolised with a small circle above the number. For example, a right angle is 90° (90 degrees).
  - **Acute angles** are any angle less than 90°.
  - **Obtuse angles** are any angle that measures between 90° and 180°.
  - **Protractor** is an instrument used to measure angles.
  - **Reflex angles** are any angle between 180° and 360°.
  - **Right angles** measures 90°. It is also known as a quarter turn, as it is ¼ of a full turn, which measures 360°.

- **Descending order** means to go from the largest number to the smallest and is the opposite of ascending order. For example, 90, 80, 70, 60, 50 are numbers in descending order.

- **Diagonal** is a line joining two opposite corners of a square, rectangle or other shape.

- **Diameter** is a straight line going from one side of a circle to another, through the centre.

- **Equal symbol**, a lot of children think that this means the answer but it does not. It means the same as – both sides of the equation are the same, for example 10 x 8 = 4 x 20, both sides of this equation make 80 so therefore both sides are equal.

- **Equation** is used when the children are using either a mental or written method to solve an addition, subtraction, multiplication or division calculation.

- **Estimate** is to make a clever guess to the answer of a question, by roughly calculating the value. For example, children estimated the length of the playground to be 100 metres.

- **Factor pairs** are numbers that multiply together to make a particular number. For example, the numbers 5 and 4 are a factor pair of 20. You can multiply the factor pair, 5 and 4, together to get the larger number: 5 x 4 = 20. You can also divide the larger number by one of the factor pair to result in the other number: 20 ÷ 4 = 5.

- **Formal written methods** are the standard methods used for calculations that cannot be solved easily using mental methods. These include:
  - **Column addition and subtraction** is the process of writing numbers one above the other and then calculating each column in turn, beginning with the smallest value column and working upwards in place value.
  - **Short and long multiplication** is the process of multiplying two numbers. This is carried out by writing the numbers vertically then multiplying the numbers together beginning with the smallest value column and working upwards in place value. Long multiplication involves writing down the answers to each step.
  - **Short and long division** is the process of dividing a larger number by a smaller number, one digit at a time. This means working from the largest to the smallest place value. Long division involves writing down the answer to each step.

- **Fractions**
  - **Numerator** is the name for the top number in a fraction. For example, in the fraction ⅝, 5 is the numerator.
  - **Denominator** is the name for the bottom number in a fraction. For example, in the fraction 4/10, 10 is the denominator.
  - **Improper fraction** is one where the numerator is larger than the denominator and is also known as a 'top-heavy' fraction. For example, 11/4, 6/2 and 21/5 are all improper fractions.
  - **Mixed number** is one with both a whole number and a fraction. For example, 8 ⅔ and 5 10/12 are mixed numbers.
  - **Equivalent fractions** are ones that are equal in terms of size to another, but written using different numbers. For example, ½ is equivalent to 4/8 and 7/14.
  - **Lowest common denominator** of two or more fractions is the smallest number that can be exactly divided by each denominator. For example, 12 is the lowest common denominator of ½, ⅓ and ¼.
  - **Simplifying fractions** means to reduce it to its lowest form, by dividing the numerator and denominator by the same number. For example 8/10 can be simplified to ⅘ by dividing both the numerator and denominator by 2.
  - **Unit and non-unit fractions** - A unit fraction is any fraction with 1 as the numerator, whereas a non-unit fraction is any fraction with a number greater than 1 as the numerator. For example, ⅙ is a unit fraction, whereas 2/6 is a non-unit fraction.

- **Geometry** is the branch of maths where children learn about the properties, measurements, position and relationships of points, lines, angles and shapes.

- **Horizontal lines** are lines that go from left to right and vice versa.

- **Integer** is simply a whole number, either positive or negative. For example, 8, -23, 502 and -1000 are all integers.

- **Inverse operations** are when we can use one operation to 'undo' the other. Addition and subtraction are inverse operations of each other, similarly multiplication and division are inverse operations of each other. Children are taught to use the inverse operation to check their answers to a question.

- **Mastery** in a maths topic means that children not only understand how to work out problems, but can also explain how they worked it out and apply their knowledge to more complicated word problems and investigations.

- **Measurements:**
  - **Units of measure** is an agreed quantity by which we measure things, e.g. metres, centimetres, litres, millilitres, grams and kilograms are all units of measure.
  - **Capacity** of a container is how much that container can hold, measured using units such as litres, millilitres, pints etc.
  - **Length of an object** is how long or short something is, and is usually measured in metric units such as centimetres, metres and kilometres.
  - **Mass of an object** is how much it weighs and is usually measured in grams and kilograms. For example, the mass of a bag of sugar is 1 kilogram.
  - **Metric measurement systems** are the systems used for measuring when the units of measure go up in 10s or multiples of 10. For examples there are 10 millimetres in a centimetre, 100 centimetres in a metre and 1000 metres in a kilometre.
  - **Imperial measurement system** is a system for measuring that was developed in the 19th century. Examples of imperial measurements are pounds and ounces for mass, inches, yards and miles for length and distance. We do not use them very much now, except for measuring distance and pints for volume.
  - **Converting between units of measure** is when we are changing a measurement from one unit to another, e.g. from metres to centimetres.
    - **Length and distance** are measured in kilometres (km), metres (m), centimetres (cm) and millimetres (mm). There are:
      - 10 mm in 1 cm
      - 100 cm in 1 m
      - 1000 m in 1 km
    - **Mass** is measured in grams (g) and kilograms (kg). There are:
      - 1000 g in 1 kg
    - **Volume** is sometimes measured in litres (l) and millilitres (ml). There are:
      - 1000 ml in 1 l
  - **Converting between imperial and metric systems of measure** can be useful, for example between miles and kilometres. To do this children need to know the relationship between them. Here are some common examples:
    - There are about 1.6 kilometres in a mile
    - There are about 0.6 miles in a kilometre
    - There are about 2 pints in a litre
    - There are about 0.5 litres in a pint

- **Mental Maths** is the ability to calculate mentally, i.e. in your head without writing anything down. Learning things such as number bonds, number patterns, doubles and multiplication table facts are important mental skills.

- **Mirror line** is a line that can be drawn through the centre of a shape or picture to show that both sides are exactly the same.

- **Missing number problems** are equations where one of the numbers has been taken out. The missing number could be represented by a space, question mark or shape, e.g. 12 + ____ = 16. Children have to use related number facts to work out the answer. These types of questions help to prepare children for algebra.

- **Multiple** is the result of multiplying one integer by another. Multiples of a number are those in that numbers times table. For example, multiples of 7 include 14, 35, 49 and 84.

- **Negative numbers** are any number lower than 0 and is commonly taught using temperatures. For example, -2, -14, -67.

- **Number square** is a visual image that is displayed in all classrooms to help children understand the concept of number and place value.

- **Number bonds** are pairs of numbers that make up a total.

- **Number line** is a visual image which is used to help children understand the basic number relationships. They will use them to count forwards and backwards in various scales, depending on the scale of the number line.

- **Number sentence** is how an equation is written, using numbers and symbols. For example, 5 + 7 = 12 is an addition number sentence.

- **Odd and even numbers** - An even number is any number that can be divided into two equal groups and always end in 0, 2, 4, 6 and 8. An odd number is any number that can't be divided into two equal groups and always end in 1, 3, 5, 7 and 9.

- **Order of operations** is the order in which the operations should be carried out within an equation: multiplication and division, then addition and subtraction, working from left to right.

- **BODMAS** is a rule for the order to work out calculations with mixed operations. It stands for Brackets, Orders, Division, Multiplication, Addition, Subtraction and is sometimes seen as BIDMAS (Brackets, Indices, Division, Multiplication, Addition, Subtraction).

- **Ordinal numbers** tell us what position something is in a list, often taught using dates or the results of races. For example, Ben finished in 1st place, Chris in 2nd and Alex in 3rd. The contrast of this is a cardinal number.

- **Parallel** is a straight line that always stays the same distance from another line and never meets, a good example of this are train tracks as they never get closer or further apart. Shapes are often used to teach parallel lines. For example, a square has two pairs of parallel lines.

- **Partitioning** a number means to expand the number. For example, 58 is partitioned into 50 and 8. It is often used to break down numbers when multiplying or dividing larger numbers to make the equation easier.

- **Percentage** means 'out of 100' and is used to show a number or ratio expressed as a fraction of 100. Children often use percentages when talking about sales in shops. For example, this £80 jacket had 20% off in the Christmas sale.

- **Perimeter** is the distance around a 2D shape and is often taught using the example of fences around a field or garden.

- **Perpendicular lines** are two lines that meet to create a right angle, often seen in shapes.

- **Place value** is the value of a digit which is dependent on its place and is the basis of our entire number system.

- **Prime numbers** are any number greater than 1 that can only be divided equally by itself and 1. For example, 5, 7, 11 and 13 are prime numbers.

- **Probability**, chance and likelihood - Probability is the study of how likely or how big a chance there is that something will happen. It can be described in words, fractions, percentages or ratios. For example, there is a 20% chance of rain tomorrow.

- **Product** of two numbers is the name for the answer to a multiplication calculation. For example, 35 is the product of 5 x 7.

- **Proportion** is a portion or part of a whole, and is often taught alongside ratio.

- **Radius** is the distance from the centre of a circle to its circumference and is half the diameter.

- **Range** is the difference between the largest and smallest number in any given group of numbers.

- **Ratio** is a way of comparing the amounts of different things, for example if a recipe asks for flour and sugar in a ratio of 2:1, it means that you need 2 lots of flour for every 1 lot of sugar that you put in. Everything in a ratio needs to be measured in the same kind of unit. You may also see ratio on map scales. In this case it tells you the relationship between the distance on the map and the distance in real life, for example 1:10,000 would mean that 1cm in the map represents an actual distance of 10,000cm.

- **Reflection of shapes** are a drawing of a shape reflected in a mirror line, with the reflection on the other side of the line but facing in the opposite direction.

- **Reflective symmetry** is a type of transformation, looking at when a shape or pattern is reflected in a mirror or line of symmetry. The reflected shape should be exactly the same size and distance from the mirror line as the original.

- **Renaming in addition** is when there are too many ones in the one column and we rename 10 ones as 1 ten, this also applies to the rest of the columns. This is what we would have called carrying a long time ago.

- **Renaming in subtraction** is when we are subtracting and the number we are subtracting is bigger than the number we are subtracting from, for example 4 (tens) subtract 7 (tens), we would then look to the hundreds column and then we rename 1 hundred as 10 tens which means that we had 14 tens (140) subtract 7 tens (70). This is what we would have called borrowing a long time ago.

- **Roman numerals** are the numbers used in ancient Rome, with letters from the Latin alphabet representing certain numbers. They are commonly taught using years. For example, V = 5, X = 10, C = 100, M = 1000, so 1066 is MLXVI.

- **Rotation of shapes** is when a shape is moved around a fixed point, either clockwise or anticlockwise and by a certain number of degrees. However, the shape doesn't change size.

- **Rotational symmetry** is a type of transformation, where a shape is turned around a central point, without changing its size.

- **Rounding numbers** - To round a number means to adjust it to it's nearest 10, 100, 1000 that makes calculating with it easier. Numbers are usually rounded to the nearest 10, 100 or 1000, with decimals being rounded to the nearest whole number, tenth or hundredth. For example, 426 rounds to 430 to the nearest 10, but 400 to the nearest 100.

- **Repeated addition** is a technique used to teach multiplication in Key Stage 1, where children add 'lots' of numbers together. For example, 3 'lots' of 5 is 5 + 5 + 5 as well as 3 x 5.

- **Scale factor** is used when we increase or decrease a 2D shape in size, so we make the shape larger or smaller depending on the scale factor. For example, this shape has been increased by a scale factor of 2.

- **Sequence** is a set of things (usually numbers) that are in an order. Each number in the sequence is called a term. To find missing terms in a sequence, first you need to find the rule behind the sequence. For example, in the sequence 2 4 6 8 the rule is to add 2 to the previous number. The next number in sequence would be 10.

- **Shape, Space and Measure** is a term used in curriculum documents and refers to work done with shapes, spatial awareness (for example volume and area) and measurements (for example centimetres, metres, litres).

- **Shared between** is a phrase used when introducing division, to show how a set of objects can be 'shared' into equal sized groups.

- **Square numbers and Square roots** - A square number is the result of multiplying a number by itself. When writing this, we write a small two next to and above the number. For example, $7^2 = 7 \times 7 = 49$.

- **Sum** of two numbers is another name for an addition calculation. For example, the sum of 15 and 23 is 38.

- **Symmetry** - When a picture or shape is the same on both sides, we call it 'symmetrical', and this can be shown by drawing a line of symmetry through the centre and seeing if both sides are the same.

- **Tessellation** is when shapes fit together exactly with no gaps. An example of this in real life are floor tiles.

- **Time intervals** are the length of time between two times. For example, the time interval between 1:15 and 1:45 is 30 minutes.

- **Translation of shapes** - Translation is a type of transformation, where a shape is moved into a new position, without being changed in any way.

- **Triangular numbers** are numbers that can make a triangular dot pattern. For example, 1 + 2 = 3, 2 + 3 = 5, 3 + 5 = 8, 5 + 8 = 13 etc.

- **Turns** are a movement in a circle, with a quarter turn being the same as 90°, a half turn as 180° and a full turn as 360°, either clockwise or anticlockwise.

- **Using and applying mathematics** – we use maths in everyday life, drawing upon our maths knowledge and applying it, for example to calculate how much wallpaper we need to buy when redecorating. This is known as 'using and applying' our maths skills in everyday life.

- **Venn diagrams** are a visual way of sorting different objects or numbers into overlapping circles with different rules, with anything in the overlapping part sharing both rules.

- **Vertical lines** run up and down, from top to bottom.

- **Volume** is the amount of space an object occupies, especially 3D shapes. Children will learn the formula for finding the volume of a shape, which is the length x width x height, with the answer having units with a cube number, for example cm^3.

- **Word problem** is a problem that is written in everyday language that requires maths to find the answer. Children will work with word problems frequently. There are a variety of different word problems that your children could encounter:
  - **One-step word problems** are problems that require the children to carry out one equation to find the answer.
  - **Two-step word problems** require the children to carry out two equations to find the answer.
  - **Multi-step word problems** require the children to carry out a number of equations to find the answer.

- **X-axis** is the horizontal axis on a graph, along which we find the x-coordinate (by going 'along the corridor').

- **Y-axis** is the vertical axis on a graph, along which we find the y-coordinate (by going 'up the stairs').

- **Zero** is a placeholder between +1 and -1, it has no value but changes the value of other numbers. For example, in the number 703 it changes the number 73 to the much larger 703.