Kensington Junior Academy

Mathematics Substantive knowledge Progression Map

MEASURMENT					
LENGTH, HEIGHT, MASS, WEIGHT, CAPACITY AND VOLUME					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Length is the measure of how long something is end to end. Height is the measure of how high something is from head to foot or top to base. Mass or weight is the measure of the amount of something and how heavy it is. Capacity is how much a container can hold. Volume is the space that water takes up in a container.	Length, width and height can be measured in cm and m. There are 100cm in a metre. Mass can be measured in kg or g. 1000g = 1kg Temperatures can be measured in degrees Celsius. 0 degrees is the freezing point of water and 100 degrees is the boiling point. Capacity can be measured in ml and l. There are 1000ml in 1 litre.	Length, width and height can be measured in cm and m. There are 100cm in a metre. Mass can be measured in kg or g. 1000g = 1kg Temperatures can be measured in degrees Celsius. 0 degrees is the freezing point of water and 100 degrees is the boiling point. Capacity can be measured in ml and l. There are 1000ml in 1 litre.	There are 100cm in a meter There are 1000m in a km There are 1000g in 1kg There are 1000ml in 1 litre Kilo is derived from a Greek word meaning one thousand.	Imperial units were used in Britain from 1820's to 1960's until the metric unit took over. 1 inch = 2.5cm 1 foot = 12 inches = 30cm (approximately) 1 yard = 3 feet = 941cm (approximately 1m) 1 mile = 1760 yards = 1.6km 1 ounce = 28g 1 pound = 16 ounces = 453g (approximately 1/2kg) 1 pint = 568ml (approximately 1/2l) 1 gallon = 8 pints = 4.5l Capacity is a measure of how much something can hold. Volume is the measure of the space that an object or liquid takes up.	Volume of cubes and cuboids are calculated by multiplying the length, width and height. Standard units of volume are cubic centimeters or cm^3 or cubic metres or m^3
TIME					
Events can be sequence using these words:	An analogue clock face can be divide into 60 minutes.	Duration is the length of time something lasts.	There are 60 minutes in an hour and 60 seconds in a minute. There are 7 days in a week and between 28 and 31 days in month. 365 days in a year and 364 in a leap		

Kensington Junior Academy

Mathematics Substantive knowledge Progression Map

before, after, now, next, first, today etc. The past refers to events that have already happened. The present refers to events that are happening now and the future refers to events that haven't happened yet. Time can be described using words such as quicker, slower, earlier, later etc. There are seven days of the week. There are twelve months in a year and there are four seasons. The hour hand is the shorter hand on a clock and the minute hand is the longer hand on a clock. On an analogue clock, the minute hand points to 12 when it is o'clock time and points to 6 when it is half past the hour.	It shows 5 minute intervals showing the numbers 1-12 around clock face. There are 60 seconds in a minute. 60 minutes in an hour and 24 hours in a day. Clockwise is the movement around the clock form left to right. On an analogue clock the hand points to 3 at quarter past and 9 at quarter to the hour.	There are 30 days in September, April, June and November. 31 days in Jan, March, May, July, August, October and December. 28 days in February but 29 in every leap year. O'clock is used after a number from 1 to 12 to give time when it is exactly to the hour. A time in the morning is followed by am and in the afternoon pm. Noon is 12pm and Midnight is 12 am.	year, which occurs every forth year.

Kensington Junior Academy
Mathematics Substantive knowledge Progression Map

MONEY					
Recognise and know the value of different denominations of coins and notes.	Money can be measured in £ and p pence. There is 100p in a £1. Change is the money that is returned when they have paid a higher amount than the price.				
PERIMETER AND AREA					
		The perimeter is the distance around the edge of a shape.	The perimeter is the distance around the edge of a shape. Area is the amount of space inside the boundary of a 2D object or face of a 3D object.	A composite shape is made of two or more rectilinear figures. Area of a rectangle= height x width. Standard units of area are square centimetres or centimetres squared and square metres and metres squared.	Area= height x width is the formula for calculation the area of a rectangle. Volume= length x width x height is the formula for calculating the volume of a cuboid. The area of a triangle is found by multiplying the length and height and then dividing by 2. The area of a parallelogram is found by multiplying the base by the height.
SHAPES AND PROPERTIES					
There are common 2D shapes- squares, rectangles, triangles, circles etc. There are common 3D	A 2D shape has only 2 measurements. 2D shapes can be described by their number of sides and vertices. A shape has	A 2D shape has only 2 measurements. 2D shapes can be described by their number of sides and vertices.	A quadrilateral is a four-sided shape. A square has four equal sides, four right angles and four lines of symmetry. A rectangle	A polygon is regular when all sides and angles are the equal. A polygon is irregular if it has different lengths and/or angles.	Arcs are used to represent angles and a square is used to represent 90 degrees. Some 3D shapes can be opened and unopened to

Kensington Junior Academy

Mathematics Substantive knowledge Progression Map

shapes- spheres, cuboids, cubes etc.	symmetry in a vertical line if a line can be drawn down the middle of it and the left side is a mirror image of the right side. Squares and rectangles have four sides and a vertical line of symmetry. Circles have one side and a vertical line of symmetry. Triangles have three sides and may have a vertical line of symmetry. A 3D shape has three measurements and can be held. The flat surface is a called a face. The faces of cuboids can be rectangles and squares. The faces on a cube are squares. Two of the faces on a cylinder are circles. One of the faces on a pyramid may be a circle, square, rectangle or triangle. A vertex of a 3D shape is a corner where lines meet. The plural of vertex is vertices. An edge of a 3D shape joins two vertices.	A 3D shape has three measurements and can be held. A vertex of a 3D shape is a corner where lines meet. The plural of vertex is vertices. An edge of a 3D shape joins two vertices.	or oblong has two sets of two equal sides, four right angles and four lines of symmetry. A parallelogram has two sets of two equal sides, two sets of two equal angles and usually no lines of symmetry. A rhombus has four equal sides, two sets of two equal angles and a line of symmetry. A trapezium has at least two parallel sides and can have a pair of equal angles and a line of symmetry. An equilateral triangle has three equal sides and angles and three lines of symmetry. An isosceles triangle has two equal sides and angles. A scalene triangle has no equal angles. A right-angled triangle has a 90 degree angle. The angles in any triangle have a sum of 180 degrees.		create a flate shape. The unfolded shape is called a net. A circle is a 2D shape. The total distance around the edge of the circle is called the circumference. Diameter of a circle is the straight line segment that passes through the centre. Radius is a straight line from the centre to the circumference.

Kensington Junior Academy

Mathematics Substantive knowledge Progression Map

POSITION AND DIRECTION					
	A half is on of two equal parts of a whole object, shape, quantity or movement. A quarter is one of four equal parts of a whole object, shape or quantity. Clockwise is the movement in the direction of the rotation of the hands of a clock. The opposite direction is anti-clockwise.		Coordinates are numbers or letters which determine the position of a point or shape in a grid, graph or map. The x-axis is horizontal from or through 0 and the y-axis is vertical from or through 0. When reading coordinates, x is read before y. A translation moves a shape up, down or from side to side, without reflecting it or changing the shape.	A reflection is the image of a shape, if it was looked at in a mirror. Shapes that have been translated or reflected are the same size as the original.	A full coordinate grid has four quadrants. Reflected shapes are the same distance from the axis that they have been reflected.
ANGLES					
	A vertex is where two lines meet. An angle is the amount of turn or space, between two lines around the vertex and is measured in degrees.	A vertex is where two lines meet. An angle is the amount of turn or space, between two lines around the vertex and is measured in degrees. A right angle is a quarter-turn. Horizontal lines go across and vertical lines go up and down. Perpendicular lines are	An acute angle is less than a right angle, an obtuse angle is greater than a right angle but less than a straight angle.	A reflex angle is greater than a straight angle, 180 degrees, but less than 360 degrees.	Vertically opposite angles are the angles opposite each other when two lines cross and are always equal. The angles in a quadrilateral or polygon have a sum of 360 degrees.

Kensington Junior Academy

Mathematics Substantive knowledge Progression Map

		lines that form a right angle where they meet or cross. They are always the same distance apart.			
SYMMETRY					
	A shape or object is symmetrical if you can draw a straight line vertically, horizontally, or diagonally down the middle of it and the two sides are a mirror image of each other. The straight lines are called lines of symmetry.				
STATISTICS					
RECORDING AND ORGANISING					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Data is facts and figures. A table in maths is a way to set out data so that it is easy to record and see. Tally marks are a quick way to keep track of numbers in groups of five. A pictogram uses pictures to represent data.		Discrete data can only be shown in integers.		
AVERAGES					

Kensington Junior Academy

Mathematics Substantive knowledge Progression Map

					Mean is a type of average. It is the total of numbers divided by how many numbers there were. Mode is the value that appears most frequently in a data set. Median is the middle of a sorted list of numbers. The range is the difference between the lowest and highest numbers in a set of data.

MATHEMATICAL VOCABULARY					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
To read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at year 1.	To read and spell mathematical vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1.	To read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.	To read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.	To read, spell and pronounce mathematical vocabulary correctly.	To read, spell and pronounce mathematical vocabulary correctly.

RATIO AND PROPORTION					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
					Ratio is a part to part comparison. The ratio of a to b is usually written a : b. Example: In a recipe for pastry fat and flour are mixed in the ratio 1

Kensington Junior Academy

Mathematics Substantive knowledge Progression Map

					: 2 which means that the fat used has half the mass of the flour, that is amount of fat/amount of flour = ½. Thus ratios are equivalent to particular fractional parts. a : b can be changed into the unitary ratio 1 : b/a , or the unitary ratio a/b : 1. Any ratio is also unchanged if any common factors can be divided out. Scaling is to enlarge or reduce a number, quantity or measurement by a given amount (called a scale factor). e.g. to have 3 times the number of people in a room than before; to find a quarter of a length of ribbon; to find 75% of a sum of money. Scale factor is for two similar geometric figures, the ratio of corresponding edge lengths.
MEASUREMENT					
COMPARING AND ESTIMATING					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

Kensington Junior Academy

Mathematics Substantive knowledge Progression Map

Events can be sequence using these words: before, after, now, next, first, today etc. The past refers to events that have already happened. The present refers to events that are happening now and the future refers to events that haven't happened yet. Time can be described using words such as quicker, slower, earlier, later etc. There are seven days of the week. There are twelve months in a year and there are four seasons. The hour hand is the shorter hand on a clock and the minute hand is the longer hand on a clock. On an analogue clock, the minute hand points to 12 when it is o'clock time and points to 6 when it is half past the	Less than symbol shows that the value to the left of it is lower than the value to the right. Greater than symbol shows that the value to left of it is greater than the value to the right. Equals shows that the number of each side should have or has the same value.	Duration is the length of time something lasts. There are 30 days in September, April, June and November. 31 days in Jan, March, May, July, August, October and December. 28 days in February but 29 in every leap year. O'clock is used after a number from 1 to 12 to give time when it is exactly to the hour. A time in the morning is followed by am and in the afternoon pm. Noon is 12pm and Midnight is 12 am.		Area of a rectangle= height x width. Standard units of area are square centimetres or centimetres squared and square metres and metres squared.	Volume= length x width x height is the formula for calculating the volume of a cuboid.

Kensington Junior Academy
Mathematics Substantive knowledge Progression Map

hour. Length is the measure of how long something is end to end. Height is the measure of how high something is from head to foot or top to base. Mass or weight is the measure of the amount of something and how heavy it is. Capacity is how much a container can hold. Volume is the space that water takes up in a container.					

STATISTICS					
INTERPRETING, CONSTRUCTING AND PRESENTING DATA					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

Kensington Junior Academy

Mathematics Substantive knowledge Progression Map

	Pictograms are a format for representing statistical information. Suitable pictures, symbols or icons are used to represent objects. For large numbers one symbol may represent a number of objects and a part symbol then represents a rough proportion of the number.	Bar charts are a format for representing statistical information. Bars, of equal width, represent frequencies and the lengths of the bars are proportional to the frequencies (and often equal to the frequencies). Sometimes called bar graph. The bars may be vertical or horizontal depending on the orientation of the chart. A table is a an orderly arrangement of information, numbers or letters usually in rows and columns.	Line graphs are a graph in which adjacent points are joined by straight-line segments. Such a graph is better seen as giving a quick pictorial visualisation of variation between points rather than an accurate mathematical description of the variation between points.	To know how to complete, read and interpret information in tables, including timetables	Pie charts also known as pie graph is a form of presentation of statistical information. Within a circle, sectors like 'slices of a pie' represent the quantities involved. The frequency or amount of each quantity is proportional to the angle at the centre of the circle.

Algebra					
EQUATIONS					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

Kensington Junior Academy

Mathematics Substantive knowledge Progression Map

					Algebra is the part of mathematics that deals with generalised arithmetic. Letters are used to denote variables and unknown numbers and to state general properties. Example: a(x + y) = ax + ay exemplifies a relationship that is true for any numbers a, x and y. Adjective: algebraic
FORMULAE					
			Perimeter can be expressed algebraically as 2(a + b) where a and b are the dimensions in the same unit.		