



CURRICULUM MAP FOR MATHEMATICS

YEAR 8

HALF TERM 1: Organising Data and the Language of Algebra Organising Data - Read and interpret two-way tables. - Read and interpret Venn diagrams. - Enumerate two-way tables and Venn diagrams. - Read and use the notation for probability. - Express a probability of success as a fraction of total trials. - Understand set notation for Venn diagrams (including listing elements of a set, the union of sets, the intersection of sets and the empty set). - Be aware of the concept of degrees of freedom when enumerating two-way tables. - The Language of Algebra - Understand the meaning of key vocabulary. - Identify examples of the key vocabulary. - Use and interpret algebraic notation (including $a+a+a = 3a$, $3 \times a = 3a$, $a \times b = ab$, $a \times a = a^2$, $a \div b = \frac{a}{b}$) - Substitute numerical values into formulae and expressions following the correct order of operations. - Substitute numerical values into scientific formulae in order to make a comparison or problem solve (including speed, distance and time and mass, density and volume) - Collect like terms in an expression or equation. - Simplify expressions or equations involving multiplication/division of terms		Opportunities for wider reading and key words: Students will read worded problems with pronunciation corrected when necessary. Key words: Frequency Probability Element Set Intersection Union Empty set Term Expression Inequality Formula Coefficient Substitute Collect like terms Simplify
		Opportunities for extended writing: Students will complete a 'What a bad one looks like' known as WABOLL; an incorrectly answered question. Students are required to identify the misconceptions and provide a written explanation in their own words.
		Speak like an expert: Emphasis on correctly reading algebraic terminology. Students will be able to read $3y$ as "three y" and "three lots of y". Students will be able to read ab as "a multiplied by b" and "ab". Students will be able to read coefficients. Eg: "The coefficient of $3y$ is 3". Students will be able reason why terms are like terms or not.
		Homework, links to careers, personal development and other subjects: Homework: Set weekly on Sparx Maths to revise key concepts covered. Personal Development: Data presentation and analysis. Logical thinking skills. Careers: Marketing, Sales, Research, Finance, Education, Science, Engineering. Links to other subjects: Geography: Reading and using charts and diagrams. Using and



CURRICULUM MAP FOR MATHEMATICS

YEAR 8

		analysing charts/diagrams to present data and draw conclusions. IT: Creating charts and diagrams in Microsoft Excel. Science/Computer Science: Understanding the foundation concepts of Algebra.
HALF TERM 2: Algebraic Manipulation and Linear Equations <i>Taught prerequisites:</i> - Understand the laws of indices for multiplication, division and use of brackets to terms with the same base. - Interpret and compare numbers in standard form. - Multiply and divide numbers in standard form. Algebraic Manipulation - Understand the laws of indices for multiplication, division and use of brackets to terms with the same base. - Simplify terms involving indices. - Multiply a single term over a bracket. - Multiply out brackets in expressions and simplify by collecting like terms. - Factorise expressions (into one bracket) by taking out the highest common factor. - Understand that every operation as an inverse operation. - Rearrange equations/formulae/identities, using inverse operations, to maintain equivalence. - <i>Change the subject of an equation/formula/identity by rearranging.</i> Linear Equations - Solve linear equations (one step, two step and including brackets) by maintaining equivalence through balancing. - Understand what the solution to an equation represents (and how it can be checked). - <i>Solve linear equations with an unknown on both sides.</i> - <i>Solve inequalities with an unknown on one side.</i> - <i>Understand that an equation with have a solution but an inequality will have a solution set.</i>		Opportunities for wider reading and key words: Students will read worded problems with pronunciation corrected when necessary. Key words: Base Index/power Expand Factorise Inverse operation Balance Rearrange Solve Solution <i>(Change) the subject</i>
		Opportunities for extended writing: Students will complete a 'What a bad one looks like' known as WABOLL; an incorrectly answered question. Students are required to identify the misconceptions and provide a written explanation in their own words.
		Speak like an expert: Students will need to verbally explain key words and concepts. E.g. "the inverse operation of multiplying by 5 is dividing by 5."
		Homework, links to careers, personal development and other subjects: Homework: Set weekly on Sparx Maths to revise key concepts covered. Personal Development: Problem-solving, analytical thinking, critical thinking and pattern recognition. Building foundation concepts for higher mathematical learning. Careers: Marketing, Sales, Research, Finance, Education, Science, Engineering. Links to other subjects: Science/Computer Science: Building fluency with algebraic concepts to allow students to apply their mathematical skills to changing the subject and solving equations involving compound measures such as speed, density, pressure etc...



CURRICULUM MAP FOR MATHEMATICS

YEAR 8

HALF TERM 3: Sequences, Linear Graphs and Transformations <u>Sequences</u> - Continue numerical and non-numerical sequences by spotting patterns. - Recognise arithmetic (and geometric) sequences. - Continue an arithmetic sequence by finding the term-to-term rule. - Appreciate the nth term is a unique way of describing a sequence, unlike the term-to-term rule. - Find the nth term of an arithmetic sequence. - Recognise a Fibonacci sequence. - Use the nth term of an arithmetic sequence to generate a sequence or find a particular term. <u>Linear Graphs</u> - Plot and read coordinates in all four quadrants. - Draw horizontal and vertical graphs from their equation. - Recognise horizontal and vertical graphs and be able to give their equation. - Draw graphs of linear functions in terms of x and y in the Cartesian plane. - Recognise graphs of linear functions in terms of x and y in the Cartesian plane. <u>Transformations</u> - Identify lines of symmetry in a 2D shape. - Reflect an image in a mirror line (including when given on a coordinate grid). - Describe a reflection mathematically. - Rotate an image (including when given on a coordinate grid). - Describe a rotation mathematically. - Translate an image (including on a coordinate grid). - Describe a translation by describing its movement. - Describe a translation mathematically (use of column vectors)	 Opportunities for wider reading and key words: Students will read worded problems with pronunciation corrected when necessary. Key words: Sequence Term Arithmetic Geometric Fibonacci sequence Term-to-term rule nth term Quadrant Horizontal Vertical Linear Symmetry Reflect Translate
 Opportunities for extended writing: Students will complete a 'What a bad one looks like' known as WABOLL; an incorrectly answered question. Students are required to identify the misconceptions and provide a written explanation in their own words. When students are describing transformations they must use the correct mathematical terminology and criteria. E.g. The shape has been rotated 90°, center of rotation (0,0), clockwise. Students will need to reason whether terms will or will not be part of a given sequence.	 Speak like an expert: Students will need to verbally explain key words and concepts. e.g. "the sequence is arithmetic because the term-to-term rule is $+3$." Students must use the mathematical terms "rotate, reflect, translate" and not "turn, flip, move".
 Homework, links to careers, personal development and other subjects: Homework: Set weekly on Sparx Maths to revise key concepts covered. Personal Development: Pattern recognition, analytical thinking, spatial reasoning, geometric understanding, algebraic generalisation and problem-solving. Careers: Finance, Engineering, Data Science, Architecture, Construction, Mathematical	



CURRICULUM MAP FOR MATHEMATICS

YEAR 8

		Modelling, Civil Engineer, Graphic Design, Cryptography. Links to other subjects: Photography/Art: Exploring the transformation of shapes and images and use of the Golden Ratio. Science: Patterns and sequences in nature (Golden Ratio). Coordinate plotting and graph drawing skills.
HALF TERM 4: 2 Dimensional Shapes (2) and 3 Dimensional Shapes 2 Dimensional Shapes - Enlarge an image by a positive integer scale factor (including on a coordinate grid). - Enlarge an image by a positive fractional scale factor (including on a coordinate grid). - Calculate the scale factor of an enlargement. - Fully describe an enlargement mathematically. - Understand that mathematically similar shapes are created through enlargements. - Find missing lengths of the larger shape in mathematically similar shapes. - Find missing lengths of either shape in mathematically similar shapes. - Label parts of a circle (radius, diameter, chord, tangent, sector, segment) - Calculate the perimeter of a circle. - Calculate the area of a trapezium. - Calculate the area of a circle. - Calculate the perimeter and area of compound shapes including sectors. 3 Dimensional Shapes - Recognise 3D shapes and describe them mathematically (using key words). - Identify the plan view and elevations of a 3D shape. - Draw 3D shapes using isometric paper. - Identify the net of cubes (and cuboids).	 Opportunities for wider reading and key words: Students will read worded problems with pronunciation corrected when necessary. Key words: Enlarge Scale factor (Mathematically) similar Radius Diameter Chord Tangent Sector Segment Face Edge Vertex/vertices Plan view Front elevation Side elevation Net	
	 Opportunities for extended writing: Students will complete a 'What a bad one looks like' known as WABOLL; an incorrectly answered question. Students are required to identify the misconceptions and provide a written explanation in their own words. When students are describing enlargements they must use the correct mathematical terminology and criteria. E.g. The shape has been enlarged by a scale factor of 2 with a center of enlargement (0,0). Students will be able to reason in problem solving questions regarding area and perimeter. <i>E.g. Will a farmer have enough fencing to go around his field?</i>	
	 Speak like an expert: Students will need to verbally describe 3D shapes by using their mathematical properties e.g. "A cube has 6 identical faces, 12 edges and 8 vertices. A cuboid is similar but..." "	



CURRICULUM MAP FOR MATHEMATICS

YEAR 8

		Students must use the mathematical term “enlargement” and not just refer to a shape as “getting larger”.
		Homework, links to careers, personal development and other subjects: Homework: Set weekly on Sparx Maths to revise key concepts covered. Personal Development: Spatial reasoning, visual awareness, problem-solving skills. Careers: Architecture, Construction, Engineering, Cartography, Artist, Graphic Designer. Links to other subjects: 3D design: Use of properties of shapes and the elevations of 3D shapes. Art/Photography: Use of enlargement to create different artistic effects. Science: Area of 2D shapes needed to find the volume of 3D shapes.
HALF TERM 5: Measures of 3D Shapes and Angle Properties <u>Measures of 3D Shapes</u> - Understand what is meant by the surface area of a 3D shape.		Opportunities for wider reading and key words: Students will read worded problems with pronunciation corrected when necessary. Key words: Surface area



CURRICULUM MAP FOR MATHEMATICS

YEAR 8

- Calculate the surface area of cubes (and cuboids) by first considering their nets. - Calculate the surface area of triangular prisms and cylinders (when all dimensions are given) - Calculate the volume of cubes and cuboids. - Calculate the volume of triangular prisms and cylinders. Angle Properties - Recall the angle properties of a straight line and vertically opposite angles. - Identify alternate and corresponding angles in parallel lines. - Calculate missing angles in parallel lines. - Identify interior and exterior angles in polygons. - Understand and use the relationship between adjacent interior and exterior angles. - Understand and use the relationship between all exterior angles of any polygon. - Understand the impact of being a regular polygon has on its angles and use this to calculate an exterior (and then interior) angle. - Be able to calculate the number of sides a regular polygon has when given an exterior or interior angle.	Alternate (angle) Corresponding (angle) Interior (angle) Exterior (angle) Adjacent Regular Irregular
	 Opportunities for extended writing: Students will complete a 'What a bad one looks like' known as WABOLL; an incorrectly answered question. Students are required to identify the misconceptions and provide a written explanation in their own words. Students will mathematically reason how they have arrived at an answer for a given angle using relevant angle properties. Students must not write terms such as "z-shaped/ f-shaped/c-shaped angles" in reasoning. Instead alternate/corresponding/co-interior angles must be used.
	 Speak like an expert: Students will need to verbally explain key words and concepts. e.g. "these two angles are equal because they are alternate angles in parallel lines."
	 Homework, links to careers, personal development and other subjects: Homework: Set weekly on Sparx Maths to revise key concepts covered. Personal Development: Spatial reasoning, geometric problem-solving, measurement and conversion, mathematical modelling, precision and accuracy, analytical thinking skills. Careers: Architecture, Civil/Chemical/ Mechanical Engineering, Housing Surveyors, Carpentry, Electricians, Plumbers. Links to other subjects: Science: Use of angles to solve mechanics based problems. Use of surface area and volume in calculations. Art/3D Design: Using angle properties and surface area/volume calculations to design a working product from a prototype.
HALF TERM 6: Constructions Constructions - Recall the use of a protractor to measure angles. - Use a pair of compasses to draw a circle given the radius (or diameter).	 Opportunities for wider reading and key words: Students will read worded problems with pronunciation corrected when necessary. Key words: Construct



CURRICULUM MAP FOR MATHEMATICS

YEAR 8

- Understand that to draw a triangle three details need to be given (SAS; side-angle-side, ASA; angle-side-angle or SSS; side-side-side). - Understand that when given AAA (angle-angle-angle) several triangles could be constructed. All of which would be mathematically similar. - Accurately construct triangles (as described above) using the correct mathematical equipment. - Understand what is meant by congruence and be able to identify congruent shapes. - Understand that triangles constructed by SAS, ASA or SSS are congruent triangles. - Understand that any rotation or reflection of the same triangle are congruent. - Draw the locus of all points a given distance from a point using the correct mathematical equipment. - Draw the locus of all points a given distance from a line using the correct mathematical equipment. - Construct an angle bisector using the correct mathematical equipment. - Construct a perpendicular bisector using the correct mathematical equipment. - Use constructions and loci to identify a point or region equidistant from two points or lines.		Congruent Locus/loci Bisect(or) Perpendicular Equidistant
		Opportunities for extended writing: Students will complete a 'What a bad one looks like' known as WABOLL; an incorrectly answered question. Students are required to identify the misconceptions and provide a written explanation in their own words.
		Speak like an expert: Students will need to verbally explain key words and concepts. e.g. "This line bisects the angle because it cuts it exactly in half..."
		Homework, links to careers, personal development and other subjects: Homework: Set weekly on Sparx Maths to revise key concepts covered. Personal Development: Spatial reasoning, problem-solving, logical thinking, precision and accuracy, connections between visual and symbolic representations. Careers: Architecture, Civil/Mechanical Engineering, Construction Manager, Quantity Surveyor, Interior Designer, Golf Course Designer, Cartography. Links to other subjects: DT and 3D Design: Use of constructions to create accurate, scaled, sketches. Geography: Using loci to identify regions of interest on a map.