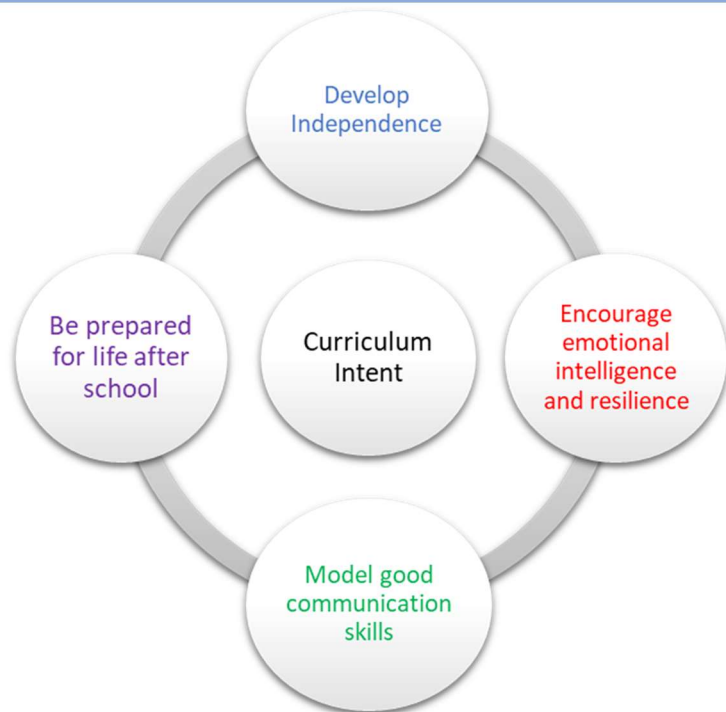


## KS4 Mathematics Level 1 Award with GCSE Pathway: Long Term Plan



### School Pedagogy:

Penkford School has a child centred pedagogy. The school adopts an inclusive, transformative pedagogy as we believe that a child's 'capacity to learn can change and be changed for the better as a result of what happens and what people do in the present' (*Hart et al. 2004, P166*). Learning is about shared communication between staff and pupils. Implementation of our curriculum intent is underpinned by Rosenshine's 10 Principles of Instruction (*Rosenshine, 2012*). All learning sessions include the following elements; reference to curriculum intent, recap of knowledge and skills, assessment for learning and pupil voice.

### Subject Specific Pedagogy:

Mathematics will be delivered to all children with reference to the National Curriculum (2014) however this will be differentiated as required in consideration of individual starting points and to meet individual learning needs which are identified via a range of formative assessments, including Diagnostic testing at the beginning of topics and ongoing teacher observation. The curriculum is progressive and builds on skills learnt in prior years. Where there are gaps in learning, and pupils have not yet mastered the component skills required to progress, provision will be adapted accordingly. Careful sequencing of topics provides the opportunity to revisit, reinforce and apply knowledge, understanding and skills learned whilst making connections across the curriculum. Concrete and pictorial resources support the development of conceptual understanding as required where new concepts are introduced. Pupils engage in sustained practice with increasingly complex problems over time and are encouraged to reason and discuss their thinking. The curriculum is designed to promote progress, challenge and achievement for all. Pupils will

have access to external accreditation at an appropriate level, for example, individual pathways are explored during KS4. Qualifications on offer include AQA Unit Awards, Entry Level Certificates, Edexcel Level 1 awards and GCSE.

**Subject Intent:**

KS2: Pupils will have access to a broad and balanced curriculum, which promotes enjoyment and enthusiasm for learning through a range of strategies. They will develop a sound understanding of number and confidently use mental and written methods of arithmetic when solving a range of problems which highlight the importance of mathematics in everyday life.

KS3: Pupils will develop into resilient individuals who are not afraid to make mistakes and who will use these as opportunities for learning. They will develop fluency in choosing and applying the correct mathematical processes and knowledge and will continue to develop appropriate communication skills in order to interpret problems, gather the necessary information and discuss and explain their thinking.

KS4: Pupils will reinforce, secure and build upon their prior knowledge, skills and understanding which they will select and apply appropriately in order to solve a range of problems. Pupils will leave Penkford School as confident and independent mathematicians who have achieved appropriate qualifications.

Level 1 – GCSE Follow on (1 year) Long Term Plan	Topic/Learning Pathway	Key Vocabulary	Links to previous learning (Component Skills)	Links to wider curriculum
Autumn 1	<p><b>Weeks 1-3</b> <b>2D shapes</b></p> <ul style="list-style-type: none"> <li>Use conventional terms and notations: points, lines, parallel lines, perpendicular lines, right angles, polygons, regular polygons, reflection and/or rotation symmetry</li> <li>Use the standard conventions for labelling and referring to the sides and angles of triangles</li> <li>Draw diagrams from written descriptions</li> <li>Derive and apply the properties and definitions of special types of quadrilaterals, including square, rectangle, parallelogram, trapezium, kite and rhombus and triangles and other plane figures using appropriate language</li> <li><b>Use the basic congruence criteria for triangles (SSS, SAS, ASA, RHS)</b></li> </ul>	<p>Point, line, parallel, perpendicular, angle, right angle, acute angle, obtuse angle, reflex angle, polygon, regular, symmetrical Right-angled triangle, isosceles triangle, equilateral triangle, scalene triangle, square, rectangle, kite, trapezium, parallelogram, rhombus Pentagon, Hexagon, Heptagon, Octagon, Nonagon, Decagon</p>	<ul style="list-style-type: none"> <li>2D shapes and their properties</li> </ul>	<p>Art: Angles and shapes English: Mathematical vocabulary Science: Using and applying formulae</p>
	<p><b>Weeks 4-7</b> <b>Angles and Lines</b></p> <ul style="list-style-type: none"> <li>Apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles</li> </ul>	<p>Point, straight line, vertically opposite, parallel, perpendicular, right angle,</p>	<ul style="list-style-type: none"> <li>Types of angles</li> <li>Estimating angles</li> <li>Measuring and drawing angles using a protractor</li> <li>2D shapes and their properties</li> </ul>	

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	<ul style="list-style-type: none"> <li>Understand and use alternate and corresponding angles on parallel lines</li> <li>Derive and use the sum of angles in a triangle (e.g. to deduce and use the angle sum in any polygon, and to derive properties of regular polygons)</li> <li><i>Apply angle facts, triangle congruence, similarity and properties of quadrilaterals to conjecture and derive results about angles and sides, including Pythagoras' theorem and the fact that the base angles of an isosceles triangle are equal, and use known results to obtain simple proofs</i></li> <li><b>Know the formulae for Pythagoras' theorem and the trigonometric ratios</b></li> <li><b>Apply them to find angles and lengths in right-angled triangles in two dimensional figures</b></li> <li><b>Exact trigonometric values</b></li> </ul>	<p>corresponding, alternate</p> <p>Sum, derive, deduce, prove</p> <p>Congruence, similarity</p>	<ul style="list-style-type: none"> <li>The four operations</li> </ul>	
Autumn 2	<p><b><u>Weeks 1-3</u></b> <b>Circles</b></p> <ul style="list-style-type: none"> <li>Identify and apply circle definitions and properties, including centre,</li> </ul>	Circle, centre, radius, diameter,	<ul style="list-style-type: none"> <li>2D shapes and their properties</li> <li>Algebraic notation</li> </ul>	Art: Circles, Using a compass, Constructing

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	<p>radius, chord, diameter and circumference</p> <ul style="list-style-type: none"> <li>• <i>Including: tangent, arc, sector and segment</i></li> <li>• Know the formula for the circumference of a circle</li> <li>• Know the formula for the area of a circle</li> <li>• Calculate perimeters of 2D shapes, including circles</li> <li>• Areas of circles and composite shapes</li> <li>• <i>Calculate arc lengths, angles and areas of sectors of circles</i></li> </ul> <p><b>Weeks 4-5</b> <b>3D solids</b></p> <ul style="list-style-type: none"> <li>• Identify the properties of the faces, surfaces, edges and vertices of cubes, cuboids, prisms, cylinders, pyramids, cones and spheres</li> <li>• Interpret plans and elevations of 3D shapes</li> <li>• <i>Construct and interpret plans and elevations of 3D shapes</i></li> <li>• <i>Surface area and volume of spheres, pyramids, cones and composite solids</i></li> </ul>	<p>circumference, pi, tangent, arc, chord, sector, segment, formula, area, perimeter, composite, surface area</p> <p>Face, edge, vertices, pyramid, prism, cube, cuboid, tetrahedron, plan, elevation, Volume, cylinder, sphere, cone</p>	<ul style="list-style-type: none"> <li>• Substitution</li> <li>• Rearranging formulae</li> <li>• The four operations</li> <li>• Square numbers</li> <li>• Perimeter</li> <li>• Calculating with fractions</li> </ul> <ul style="list-style-type: none"> <li>• 2D shapes and their properties</li> <li>• Area</li> <li>• The four operations</li> <li>• Square and cube numbers</li> </ul>	<p>English: Mathematical vocabulary Science: Using and applying formulae</p>

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	<p><b><u>Weeks 6-7</u></b> <b>Sequences</b></p> <ul style="list-style-type: none"> <li>• Generate terms of a sequence from either a term-to-term or a position-to-term rule</li> <li>• Recognise and use sequences of triangular, square and cube numbers and simple arithmetic progressions</li> <li>• <i>Including Fibonacci-type sequences, quadratic sequences, and simple geometric progressions</i></li> <li>• Deduce expressions to calculate the nth term of linear sequences</li> </ul>	<p>Sequence, pattern, term, position, rule, nth term, linear, arithmetic, geometric, triangular, square, cube</p>	<ul style="list-style-type: none"> <li>• Place value and ordering numbers</li> <li>• The four operations</li> <li>• Square and cube numbers</li> <li>• Patterns</li> <li>• Algebraic notation</li> <li>• Substitution</li> <li>• Function machines</li> <li>• Writing algebraic expressions</li> </ul>	<p>English: Mathematical vocabulary Science: Using and applying formulae</p>
Spring 1	<p><b><u>Weeks 1-2</u></b> <b>Translations</b></p> <ul style="list-style-type: none"> <li>• Identify, describe and construct congruent and similar shapes, including on coordinate axes by considering rotation, reflection, translation and enlargement</li> <li>• <i>Including fractional scale factors</i></li> </ul>	<p>Reflect, rotation, translate, enlarge, scale factor, coordinate, axis, origin</p>	<ul style="list-style-type: none"> <li>• Lines of symmetry</li> <li>• 2D shapes and their properties</li> <li>• Clockwise and anti-clockwise</li> <li>• Angles</li> <li>• Equations of lines</li> <li>• Multiplication</li> <li>• Direction – Left/Right</li> <li>• The coordinate grid</li> </ul>	<p>Art: Tessellations, reflective properties, enlargements English: Mathematical vocabulary</p>



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Spring 2	<p><b><u>Weeks 1-4</u></b> <b>Probability</b></p> <ul style="list-style-type: none"> <li>• Apply systematic listing strategies</li> <li>• Record, describe and analyse the frequency of outcomes of probability experiments using tables and frequency trees</li> <li>• Apply ideas of randomness, fairness and equally likely outcomes of multiple future experiments</li> <li>• Relate relative expected frequencies to theoretical probability, using appropriate language and the 0-1 probability scale</li> <li>• Apply the property that the probabilities of an exhaustive set of outcomes sum to 1</li> <li>• Apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to 1</li> <li>• Understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size</li> </ul>	<p>Probability, likelihood, outcome, impossible, unlikely, certain, equally likely, likely, frequency, experiment, random, bias, sample, theoretical probability, relative frequency, experimental probability, sum, mutually exclusive, dependent, independent, combination, sample space</p>	<ul style="list-style-type: none"> <li>• Calculating with decimals</li> <li>• Calculating with fractions</li> </ul>	<p>English: Mathematical vocabulary Science: Hypothesising, experimental data</p>



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	<ul style="list-style-type: none"> <li>Enumerate sets and combinations of sets systematically, using tables, grids, Venn diagrams</li> <li>Construct theoretical possibility spaces for single and combined experiments with equally likely outcomes and use these to calculate theoretical probabilities</li> <li><i>Calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions</i></li> </ul> <p><b>Weeks 5-6</b> <b>Bivariate data</b></p> <ul style="list-style-type: none"> <li>Use and interpret scatter graphs</li> <li>Recognise correlation</li> <li><i>Draw estimated lines of best fit</i></li> <li><i>Make predictions</i></li> <li><i>Interpolate and extrapolate apparent trends whilst knowing the dangers of doing so</i></li> </ul>	Bivariate data, trend, relationship, conclusion, estimation, line of best fit, outlier, positive correlation, negative correlation, causation, interpolate, extrapolate	<ul style="list-style-type: none"> <li>The coordinate grid</li> <li>Interpreting data</li> <li>Intervals and scales</li> </ul>	English: Mathematical vocabulary Science: Experimental data, drawing conclusions
Summer 1	REVISION			
Summer 2	EXAMINATIONS			