

What are the aims and intentions of this curriculum?

The aim of our Key Stage 4 curriculum is to ensure that all pupils: i) become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately. ii) reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language iii) can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Term	Topics	Knowledge and key terms	Skills developed	Assessment
Autumn 1	Equations Laws of Indices	<ul style="list-style-type: none"> • Simultaneous Equations Quadratic Equations <ul style="list-style-type: none"> • Laws of Indices • Problem Solving with Algebra • Rearranging a formula • Proof Questions <p>Key Words: Coefficient. elimination, simultaneous, factorise, power, exponent, index, perimeter, area, twice, half, more than, product</p> <p style="background-color: #90EE90; display: inline-block; padding: 2px;">Family/Relationship</p>	<ul style="list-style-type: none"> • Solve simultaneous equations in two unknowns- linear/linear. • Solve simultaneous equations in two unknowns- quadratic/linear • Solve quadratic equations by factorizing, completing the square and using the quadratic formula. • Use the laws of indices to multiply 	Treasure Hunt 'Detect and correct the error' Differentiated Worksheets True/False Card Activity KWL Exit Ticket Find someone who knows.... MathsWatch/ Transum Online activities Traffic Light Cards Summative Test

			<p>and divide numbers written in index notation, involving multiplication and division of integer powers, fractional and negative powers, and powers of a power.</p> <ul style="list-style-type: none"> • Use calculators for all calculations: positive and negative numbers, brackets, square, cube, powers and roots, and all four operations. 	
Autumn 2	Algebra	<ul style="list-style-type: none"> • Iteration • Arithmetic, Geometric, Quadratic, Special Sequences <p>Key words: subject, rearrange, express in terms of, factorise, formula, show that, iteration, approximate, solution, common difference, common ratio, rule, pattern, sequence, geometric, nth term, triangular, cube, square, odd, even, Fibonacci, quadratic, consecutive.</p> <p>Career Integration- Physicists, Nuclear Engineer, Chemist, Radiologist etc.</p>	<ul style="list-style-type: none"> • Rearrange a formula including those that require factorising. • Use iteration to find approximate solutions to equations. • Generate terms of a sequence. • Determine the nth term rule of an arithmetic or quadratic sequence. Sequence. • Recognise triangular, cube, square number 	<p>Student Project on Sequences in real life.</p> <p>Mini Whiteboard Activity</p> <p>Practice Workbook activities</p> <p>Traffic Light Cards</p> <p>Talk it through</p> <p>3-2-1</p> <p>Prove it</p> <p>Exit Card</p> <p>Exam Questions Pair Carousel</p>

			<p>sequences as well as Fibonacci type sequences.</p> <ul style="list-style-type: none"> • Answer 'show that' questions using consecutive integers $(n, n + 1)$, squares a^2, b^2, even numbers $2n$, and odd numbers $2n + 1$. 	
	<p>Number</p>	<ul style="list-style-type: none"> • Standard Form • Recurring Decimals to Fractions • Percentage Increase and Decrease using the multiplier Method • Simple and Compound Interest, Depreciation. • Repeated Percentage • Reverse Percentage • Solving Multistep Problems with Fractions and Percentages • Product Rule of Counting <p>Key words: standard form, index, power, multiplier, increase, decrease, compound interest, simple interest, percentage, original amount</p> <p>Career Integration- Scientist, Engineers, Bankers</p>	<ul style="list-style-type: none"> • Calculate with and interpret standard form $A \times 10^n$, where $1 \leq A < 10$ and n is an integer. • Change recurring decimals into their corresponding fractions and vice versa. • Describe percentage increase/decrease with fractions, e.g., 150% increase means times as big. • Find the original amount given the final amount after a percentage increase or decrease (reverse percentages), including VAT; 	<p>Scavenger Hunt</p> <p>Exit Cards</p> <p>Differentiated worksheets</p> <p>Exam Practice Questions</p> <p>Topic Tests</p> <p>3-2-1</p>

			<ul style="list-style-type: none"> • Solve multi-step problems with fractions and percentage. • Use the product rule for counting. 	
Spring 1	<p>Graphs</p> <p>Gradient and Equation of a line</p>	<ul style="list-style-type: none"> • Linear and Quadratic Graphs • Cubic, Reciprocal, Exponential Graphs • Gradient of a line • Equation of a line • Equation of a line parallel or perpendicular to a given line <p>Key words: linear, quadratic, parabola, substitute, quadratic, gradient, intercept, roots, turning point, minimum value, maximum value, parallel, coordinates, perpendicular</p> <p>Career Integration- Budget Analyst, Auditor, Epidemiologist, Market Researcher, etc.</p>	<ul style="list-style-type: none"> • Plot and draw graphs of straight line graphs in the form $y=mx+c$ or $ax+by=c$ • Plot and draw graphs of quadratic functions. • Identify the roots, line of symmetry, turning points and intercepts. • Determine the gradient of a straight line from the graph or the equation or given two points. • Determine the equation of a line from a graph or given a point and the gradient or two points. • Determine if two lines are parallel or perpendicular from the equations given. 	<p>Differentiated worksheets</p> <p>Ticket out the door</p> <p>True or False Cards</p> <p>Traffic light cards</p> <p>3-2-1</p> <p>Two stars and a wish</p> <p>Peer Feedback</p> <p>Exam questions carousel</p>

Spring 2

Angles

Bearings

Trigonometry

- Properties of angles at a point, angles at a point on a straight line, vertically opposite angles; understand and use alternate and corresponding angles on parallel lines.
- Sum of angles in a triangle.
- Angles in a Polygon, including exterior angles.
- Pythagoras Theorem
- Trigonometry Ratios
- Sine and Cosine Rule

Key Words: angles, straight line, vertically opposite, alternate, corresponding, parallel, triangle, polygons, interior, sum, exterior, properties, transversal, bearing, angle, side, Pythagoras, hypotenuse, ratios, sine, cosine, tangent, angle of elevation, angle of depression

Career Integration- Architects, Surveyors, Astronauts, Physicists, Engineers and Crime Scene Investigators

Basic first aid- angle at which CPR is done and the placement of defibrillators

- Find missing angles using properties of straight lines, at a point, in a triangle.
- Understand and use the angle properties of parallel lines.
- Calculate and use the sums of the interior angles of polygons.
- Use the sum of the interior angles of an n -sided polygon.
- Use the sum of the exterior angles of any polygon is 360° .
- Use bearings in a real-life context to describe the bearing between two towns on a map.
- Calculate the length of the hypotenuse and of a shorter side in a right-angled triangle, including decimal lengths and a range of units.
- Use the trigonometric ratios to solve 2D problems including angles of elevation and depression.

Student presentation on Basic angle properties

Angle Properties Summative Test

Angles in Parallel Tick or Trash

Mini Whiteboard Activity

Student Learning Portfolio

Practice Workbook activities

Traffic Light Cards

Talk it through-Students explain the reasons for their angle calculations using the key words.

Ticket out the door

Bearing Activity- Students stand at various points in the classroom. For each pair, Person A will estimate his/her bearing from Person B, then Person B will use that number to calculate his/her bearing from Person A.

Differentiated worksheets.

Trigonometry Treasure Hunt

			<ul style="list-style-type: none"> • Know the exact values of $\sin \vartheta$ and $\cos \vartheta$ for $\vartheta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$ and 90°; know the exact value of $\tan \vartheta$ for $\vartheta = 0^\circ, 30^\circ, 45^\circ$ and 60°. • Use the Sine and cosine rule to solve problems in non-right-angled triangles. 	
<p>Summer 1</p>	<p>Transformation Similar Shapes Congruency</p>	<ul style="list-style-type: none"> • Transformation of shapes- Translation, Reflection, Rotation and Enlargement. • Invariant points • Similar Shapes • Area and Volume of Similar Shapes • Proving congruency of triangles <p>Key Words: translation, shift, reflection, flip, rotation, turn, enlargement, single, describe, scale factor, centre of rotation, angle of rotation, mirror line, vector, invariant, congruency.</p> <p>Career Integration- CAD Engineer, Researcher, Interior Designer</p> <p>Online and Media Families</p>	<ul style="list-style-type: none"> • Transform given shapes using translation, reflection, rotation and enlargement. • Describe a transformation fully. • Describe the changes and invariance achieved by combinations of rotations, reflections and translations. • Find missing lengths, areas and volumes in similar 3D solids. • Solve problems involving frustums of cones where you have to find missing 	<p>Human Scatter Graph</p> <p>Practice Booklet</p> <p>Describe it Quiz</p> <p>Summative Assessment</p> <p>Differentiated worksheets</p> <p>Exam Past Paper Questions</p> <p>Human Translation Activity</p> <p>Reflection Paragraph</p>

			lengths first using similar triangles.	
<p>Summer 2</p>	<p>Construction and Loci</p> <p>Handling Data</p> <ul style="list-style-type: none"> Measures of Central Tendency of Raw, Ungrouped and Grouped Data Charts and Diagrams 	<ul style="list-style-type: none"> Perpendicular bisector of a line segment. Construct a perpendicular to a given line from/at a given point, bisecting a given angle. Construct given figures and solve loci problems. <p>Key Words: Construct, circle, arc, sector, face, edge, vertex, two-dimensional, three-dimensional, solid, elevations, congruent, angles, regular, irregular, bearing, degree, bisect, perpendicular, loci, map, scale, plan, region.</p> <ul style="list-style-type: none"> Averages from data and frequency tables Cumulative Frequency Graph Box Plot <p>(Respectful Relationships Cyberbullying and Performance)</p> <p>Career Integration- Economists, Scientists, Researchers and Data Journalists</p> <p>Key Words: Mean, mode, median, range, midpoint, frequency, frequency, correlation, extrapolation, interpolation, causation, line of best fit, estimate. cumulative frequency, median, lower quartile, upper quartile, interquartile range, box plot, consistent, average, frequency density, class width</p>	<ul style="list-style-type: none"> Use straight edge and a pair of compasses to do standard constructions. Find and describe regions satisfying a combination of loci; • Use constructions to solve loci problems (2D only). <ul style="list-style-type: none"> Interpreting and comparing distributions using the Mean, Median, Mode, Range of Raw, Ungrouped and Grouped Data Compare two box plot distributions <p>Draw cumulative frequency graphs</p>	<p>Mini Whiteboard Activity</p> <p>Statistics Project</p> <p>Transum Online Activity</p> <p>Differentiated worksheets</p> <p>Summative Assessments</p> <p>MathsWatch Activities</p>

