MATHEMATICS HIGHER TIER

Year 10

What are the aims and intentions of this curriculum?

The Year 10 curriculum is designed to prepare students for their GCSE examinations. It builds on the complexity, depth, and range of the Key Stage 3 (KS3) curriculum, focusing on number operations, algebra, ratio, proportion, rates of change, geometry, measurements, probability, and statistics. Students are assigned homework on a weekly basis, and it is expected that they complete it both online and offline.

Our vision is for students to be able to analyze mathematical situations, critically evaluate problems, and deduce plausible and accurate solutions. Additionally, they should become proficient enough to pursue professions and training at the highest level while communicating clearly and effectively.

Term	Topics	Knowledge and key terms	Skills developed	Assessment
Summer 2	*1. Numbers*	Highest common factor and multiple, Prime number, Indices, Standard forum, Rational and irrational number, Simplify surd, Rationlise, Composite number	List outcomes; Calculate combinations; Estimate calculations; Find the HCF and LCM, Calculating with indices (revision); Evaluate zero, negative and fractional indices; Write units of measure as powers of 10 and standard form; Multiply, divide, add and subtract standard form; Simplify surds without a calculator; Rationalise denominators (with single term denominators only)	End of topic review Homework Bookmarking Classroom feedback Half-term formal assessment
Autumn 1	*2. Algebra*	Expand Single Bracket, Expand Double Bracket, Factorise, Factoring Quadratic Equation, Solving Equation More Than One Steps, Identity, Collecting Like Term, Change The Subject, Formula, Linear, Quadratic, Fibonacci, And Geometric Sequences	Apply the laws of indices algebraically; Expand single, and multiple single brackets; Factorise common factors; Expand double brackets; Factorise quadratics of the form x2+bx+c; Factorise quadratics of the form x2+bx+c; Factorise using difference of squares; Factorisation requiring more than one step e.g. 2x2-8; Solve equations with brackets; Solve equations with fractions; Formulae, equations, expressions and identities; Change the subject of a formula; Find the n^{th} term of linear sequences and determining if a term is in a sequence; Solve problems involving Fibonacci type sequences; The n^{th} term of quadratic sequences; Investigate and extend other sequences	End of topic review Homework Bookmarking Classroom feedback Half-term formal assessment
	3. Interpreting and representing data	Stem And Leaf Diagrams, Frequency Table, Frequency Polygon, Mean, Mode, And Range, Bias, Interpreting And Presenting Data, Ethical, Creating And Interpreting Graphs, Line Of The Best Fit, Bar Chart, Line Graphs, Time Series, Correlation	Draw and interpret pie charts, back-to-back stem-and-leaf diagrams, time series graphs; Determine correlation of bivariate data and use it to determine expected values (interpolation/extrapolation); Find averages of grouped data; Draw frequency polygons; Compare measures of distribution	
	4. Fractions, ratios and percentages	Numerator, Denominator, Proper Fraction, Improper Fraction, Mixed Number, Equivalent Fraction,	Use equivalence in common, improper and mixed fractions; Use and convert between ratio and proportion; Express ratios as equations; Combine ratios; Solve problems involving direct proportion; Find percentage change, reverse	

		Simplifying Fraction, Adding, Subtract, Multiple And Divide Fraction, Solving Ratio Problems	percentage change and use repeated percentages; Increase and decrease a value by a given percentage	
Autumn 2	*5. Angles and trigonometry*	Adjacent, Vertically Opposite angle, Angle of elevation, Angle of depression, Alternate angle, Corresponding angles, Co-interior angle, Interior and exterior angles, Polygon, Trigonometry ratio, Exact value	Find angles around parallel lines; Determine the interior angles of polygons; Solve problems with the exterior angles of polygons; Apply Pythagoras' theorem; Use trigonometric ratios; Determine exact trigonometric values; Use trigonometry in calculating bearings	End of topic review Homework Bookmarking Classroom feedback Half-term formal assessment
	6. Graphs	Linear, Quadratic, Cubic And Reciprocal Graphs, Straight Line Equation, Y- Intercept, Gradient, Parallel And Perpendicular, Root, Symmetry, Turning Point, Minimum And Maximum Point, Tangent, Equation Of Circle, Segment, Finding Midpoint	Find the equation of a line; Draw straight lines using the gradient-intercept method; Draw straight lines using the cover-up method; Find the midpoint and length of a line segment; Determine the equation of a line between two points; Find the equation of parallel and perpendicular lines; Interpret graphs of rates of change; Find the roots and turning points of quadratic graphs; Drawing simple cubic ($y=ax^3$) and reciprocal ($y=k/x$) graphs; Determine the equation of a circle; Find the equation of circle tangents	
Spring 1	*7. Area and Volume*	Area of quadrilateral and triangle, Composite shapes, Error interval, Unit conversion, Arc and Sector, Radius, Diameter, Surface area of pyramid and cone	Find the area and perimeter of compound shapes; Convert measures of area and volume; Determine error intervals; Calculate using bounds; Determine the length of arcs and the area of sectors; Determine the volume and surface area of cylinders, pyramids, cones, spheres and composite shapes	End of topic review Homework Bookmarking Classroom feedback Half-term formal assessment
	8.Transformations and constructions	Four types of transformation: Translation, rotation, reflection and enlargement, Vector, Axis, Scale factor, Isometry, Perpendicular bisect line, Angle bisect, Constructing triangle	Draw plans and elevations; Draw isometric drawings; Apply and describe all transformations: Reflections, Rotation, Enlargement and Translations; Make scale drawings, involving bearings; Construct triangles, angle and line bisectors and a perpendicular line through a point; Construct Loci of equidistant points of a point, between two points, around a line, between 2 lines and around a shape	
Spring 2	*9. Equations and inequalities*	Solving simultaneous equation, Quadratic-linear simultaneous, Solving quadratic equation, Solve quadratic equation using formula, Number line, Solving inequality, Represent linear inequality, Using set of notations	Factorise quadratics; Solve quadratic equations; Complete the square; Solve equations by completing the square; Apply the quadratic formula; Solve simultaneous equations (linear-linear and linear-quadratic); Find possible values for inequalities; Solve linear (single and double) inequalities; Use a number line to represent (single and double) inequalities; Use set notation to represent linear inequalities	End of topic review Homework Bookmarking Classroom feedback Half-term formal assessment
	10. Probability	Event, Sample, Outcome, Independent, Discrete and	Determine the probability of experimental and exhaustive events; Use frequency tree diagrams (independent events) to solve probability problems;	

		continuous date, Tree diagram, experimental and exhaustive probability, Venn diagram	Represent collections using set notation; Use tree diagrams to represent conditional events; Using Venn diagrams to represent probability notation; Complete Venn diagrams use it determining probability.	
Summer 1	*11. Multiplicative reasoning* *12. Similarity and congruence*	Original Amount, Final Amount, Time, Frequency, Multiplier, Inverse Operation, Appreciation, Depreciation, Increase, Decrease, Profit, Loss Scale Factor, Corresponding Angles, Proportional Sides, Identifying Congruent Figure (SSS, SAS, ASA, RHS), Prove Congruences And Similarity, Solving Concurrence Problems	Use repeated percentages to solve growth and decay problems; Find a repeated percentage change; Calculate rates of change (speed, acceleration, etc.); Convert compound measures (including speed, density and pressure); Interpret direct and inverse proportion in terms of ratios, equations, tables and graphs; Identify similarity and congruence and use it to solve geometric problems in terms of length, area and volume; Prove similarity and congruency; Solve real life problems that require similarity and congruency	End of topic review Homework Bookmarking Classroom feedback End of year formal assessment