HIGHER: Key Stage 4 Maths Curriculum

Medium Term plan Year 9

Autumn 1	
Chapter 1: Calculations	**Chapter 2: Expressions**
Assessment: Chapter Test A	**Assessment:** Chapter Test A
Content: • Ordering integers, decimals and negative numbers • Rounding to nearest 10,100, 1000 • Rounding to decimal places • Rounding to significant figures • Estimation by rounding to one significant figure • Adding/Subtracting numbers with decimals • Adding/Subtracting negative numbers • Multiplying/Dividing negative numbers • Multiplying numbers with decimals • Division algorithm (by hand) • Division algorithm with decimals by hand • Manipulation of Decimals (using one calculation to find the answer to another) • Order of Operations (BIDMAS)	**Content:** • Apply algebraic notation to write simple expressions • Simplify expressions by collecting like terms (addition and subtraction) • Apply the Index laws (multiplication, division) • Apply the Index laws (fractional, negative and zero) • Expanding single brackets • Factorise single brackets • Expand two single brackets and simplify • Simplifying algebraic fractions Add/Subtract algebraic fractions • Multiplying algebraic fractions • Divide algebraic fractions
Key terms: Place value(Tens, Units, Tenths, Hundredths, Thousandths etc) Rounding Decimal places (dp) Significant figures (sf) Directed number Negative Estimate Partitioning Compensation Operations Order of operations BIDMAS	**Key terms:** Expression Term Constant Variable Coefficient Substituting Like terms Index/indices/power Base Expand Factorise

Autumn 2

Chapter 3: Angles and Polygons

Assessment: Chapter Test A

Content:

- Measure and describe angles as acute, right, obtuse or reflex

- Describe and apply the properties of angles around a point (sum of 360 degrees)
- Describe and apply the properties of angles on a straight line (sum of 180 degrees)

- Calculate bearings based on angles around a point

- Describe and apply the equivalence of vertically opposite angles
- Identify and apply the properties of angles in parallel lines (alternate, corresponding and co-interior rules)

- Apply knowledge of special triangles to derive angles

- Solve problems involving all of the above (providing reasons)

- Identify similarity between shapes

- Identify and describe types of congruence (SSS, SAS, ASA, RHS)

- Calculate and apply scale factors
- Calculate and apply scale factors for area and volume from the linear scale factor

- Apply similarity and congruence to problem solve

- Derive and apply the sum of angles in triangles and quadrilaterals
- Calculate interior angles in polygons (using angles in a triangle)
- Deduce and apply the sum of interior angles of any polygon and use (n-2)*180

- Calculate exterior angles in polygons

- Solve problems involving angles in polygons

Key terms:			
Degree	Three-figure bearing	Opposite angle	Exterior angle
Acute angle	Parallel	Polygon	Similar
Obtuse angle	Alternate	Quadrilateral	Scale factor
Reflex angle	Corresponding angle	Equilateral	Congruent
Right angle	Co-interior angle	Interior angle	Hypotenuse
Bearing			

Spring 1
Chapter 4: Handing Data 1
Assessment: Chapter Test A
Content: - Construct and interpreting bar charts   - Construct and interpret two way tables   - Construct and interpret pie charts   - Calculate the mean, mode and median of listed data   - Calculate the mean, mode and median of data in a frequency table   - Understand the advantages and disadvantages of different averages   - Calculate the range and interquartile range   - Identify outliers and explain their effect on averages/ranges   - Compare distributions using averages and range Construct frequency tables for grouped data   - Construct and interpret Histograms with equal widths   - Construct and interpret Histograms with unequal class widths   - Calculate frequency density
Key Terms: Two-way table Bar-chart Bar-line chart Pie chart Sector Mean Mode Median Range Lower/Upper quartile Interquartile range Discrete data Continuous data Histogram

Spring 2	
Chapter 5: Fractions Decimals and Percentages	**Chapter 6: Formulae & Functions**
Assessment: Chapter Test A	**Assessment:** Chapter Test A
Content: • Name and construct fraction diagrams • Convert between improper fractions and mixed numbers • Identify and create equivalent fractions • Simplifying fractions • Write fractions as decimals • Order fractions and mixed numbers • Calculate fractions of amounts • Calculating percentages of amounts • Multiplying fractions, including simplifying (cancelling common factors) • Multiplying fractions and mixed numbers • Dividing fractions and mixed numbers • Adding and subtracting fractions with the same denominator • Adding and subtracting fractions with different denominators • Adding and subtracting mixed numbers • Solve worded fraction problems • Write percentages as fractions and decimals • Converting between fractions, decimals and percentages • Convert recurring decimals to fractions • Compare using < or > and order fractions, decimals and percentages	**Content:** • Write formulae from sentences • Substitute to solve (positive and negative numbers) • Use standard formulae (e.g. kinematics) • Change the subject of formulae • Simplify expressions • Expand single brackets • Identify expressions, equations, inequalities, formulae and identities • Prove identities and find missing values Prove statements to be true or false • Expand double brackets • Factorise quadratic expressions • Distinguishing between, and factorise : $x^2 - 4$ and $x^2 - 4x$ • Simplify algebraic fractions • Complete the difference of two squares
Key Terms: Fraction Denominator Numerator Common factor Cancel Improper fraction Mixed number Percentage Decimal Terminating Recurring Reciprocal	**Key Terms:** Equation Formula Subject Rearrange Function Domain Range Composite function Identity Proof Counter-example Expand Factorise Quadratic

Summer 1
Chapter 7: Working in 2D
Assessment: Chapter Test A
Content: - Accurately measure and draw line segments and angles   - Apply scale to drawings -find distances on a map and in real life   - Bearings on a map   - Area of quadrilaterals (squares, rectangles, parallelograms, trapezium) and triangles   - Area of compound 2D shapes   - Sketching lines such as y = -2, y = x etc.   - Completing transformations: - Translations   - Reflections   - Rotations from origin and a point   - Enlargements (scale factor greater than 1, between 0 and 1, & negative)   - Enlargements from a point   - Combinations of Transformations   - Describing transformations
Key Terms: Length Area Area Perimeter Transformation Translation Reflection / Mirror line Rotation / Centre of rotation Enlargement / Scale factor / Centre of enlargement Invariant

Summer 2	
Chapter 8: Probability	**Chapter 9: Estimation and Approximation**
Assessment: Chapter Test A	**Assessment:** Chapter Test A
Content: • Understand the probability scale • Construct sample space diagrams List sample space of an experiment • Write experimental and theoretical probabilities as fractions • Write experimental and theoretical probabilities as relative frequencies • Calculate expected frequencies • Compare theoretical probabilities with experimental probabilities • Recognise mutually exclusive events and exhaustive events • Understand that the probabilities of mutually exclusive exhaustive events sum to one • Compare bias and equally likely events	**Content:** • Round to appropriate degree of accuracy (10,100,1000s, dps, sfs) • Use approximation to make estimates • Check calculations using approximation and estimation • Estimate square roots • Use common calculation functions • Convert units of length, mass, volume, capacity, time and area • Calculate compound units of speed and density • Rearrange compound unit calculations to find missing values • Use inequality notation to state error intervals and interpret limits of accuracy • Calculate the upper and lower bounds of rounded values
Key Terms: Trial Outcomes Event Impossible Certain Likely Unlikely Even chance Relative frequency Expected frequency Theoretical frequency Bias/ Biased Equally likely	**Key Terms;** Approximation Estimation Significant figures (sf) Length Mass Capacity Volume Speed Density Accuracy Implied accuracy Upper bound Lower bound Error interval

Year 10

Autumn 1
Chapter 10: Equations and Inequalities
Assessment: Chapter Test A
Content: - Solving two step equations (brackets, negatives)   - Solving equations involving fractions (and implied brackets)   - Solving equations with the unknown on both sides   - Forming and solving equations   - Solving quadratics graphically for the roots (x intercepts)   - Solving quadratics with/without coeff of x^2 by factorising   - Solving by completing the square   - Solving by applying the quadratic formula   - Forming and solving quadratic equations   - Solving simultaneous equations graphically   - Solving simultaneous equations using elimination   - Solving simultaneous equations using substitution   - Solving simultaneous equations between a linear and quadratic   - Forming and solving simultaneous equations   - Solving equations using trial and improvement   - Using iteration formulae to find a solution to a given number of decimal places   **NOTE**: Inequalities will be taught as part of Graphs 1
Key Terms: Completing the square Quadratic formula Simultaneous equations Eliminations Substitution Iteration

Autumn 2
Chapter 11: Circles and Constructions
Assessment: Chapter Test A
Content:

Content:
- Circumference of circles
- Area of circles
- Circumference and area of composite shapes involving parts of circles
- Arc length
- Area of sectors
- Perimeter and area of composite shapes involving sectors
- Circle Theorems
- Proof of circle theorems
- Construct angle
- Construct line bisectors (of a line, from a point to a line, from a point on a line)
- Construct triangles
- Construct quadrilaterals,
- Construct an angle of 60 degrees
- Construct loci from points, lines, around shapes etc.
- Construct loci involving a change of radius or rolling shapes etc.

Key Terms:
Circle
Diameter
Radius / Radii
Circumference
Arc
Chord
Tangent
Segment
Sector
Bisect
Perpendicular bisector
Construct
Construction lines
Locus
Loci

Spring 1	
Chapter 12: Ratio and proportion	**Chapter 13: Factors, powers and roots**
Assessment: Chapter Test A	**Assessment:** Chapter Test A
Content: - Express proportions of an amounts as fractions or percentages - Calculate percentage increases and decreases using multiplication - Find the original value follow a percentage increases and decreases - Understand and calculate simple interest - Simplify ratios - Share amounts into a ratio (ADAM) - Write ratios from worded questions - Use scale factors, scale diagrams and maps.	**Content:** - Know and use the language of prime numbers, factors and multiples - Write a number as the product of its prime factors (prime decomposition) - Construct a prime factor venn - Identify HCF - Identify LCM - Estimate the square or cube root of an integer - Find square and cube roots of numbers and apply law of indices - Simplify expressions involving surds - Rationalise fractions involving surds
Key Terms: Proportion Ratio Simplify Scale Scale drawing Percentage Interest Simple interest Percentage increase / decrease Reverse percentage problem	**Key Terms:** Product Multiple Factor Prime Prime factor decomposition Highest common factor (HCF) Lowest common multiple (LCM) Square root Cube root Surd Rationalise

Spring 2	
Chapter 14: Graphs 1	**Chapter 15: Working in 3D**
Assessment: Chapter Test A	**Assessment:** Chapter Test A
Content: • Equation of a straight line y=mx+c • Graphing linear equations • Calculating gradient • Identifying y intercept • Writing the equation for linear graphs • Properties of parallel and perpendicular lines • Writing the equations for parallel and perpendicular lines • Equation of quadratic curves $ax^2+bx+c=y$ • Identifying x intercepts (roots) and y intercepts graphically and algebraically • Identifying turning points graphically and algebraically • Graph quadratic equations • Properties of quadratic functions • Kinematic graphs (solving distance, speed and acceleration problems) • Solving Inequalities • Graphing Inequalities	**Content:** • Draw and interpret net diagrams • Calculate surface area of 3D shapes • Calculate volume of a right prism • Calculate volume of a cylinder • Calculate the volume of frustums, spheres, hemispheres pyramids and cones • Draw and interpret plans and elevation of 3D shapes • Apply compound units to calculate mass (m=vd) • Apply reasoning and problem solving
Key Terms: Gradient Turning point Y-intercept Root (x-intercepts) y=mx+c Kinematics Quadratic function Speed Parabola Acceleration	**Key Terms:** Volume Face Cross-section Edge Prism Vertex/Vertices Pyramid Plan Cylinder Elevation Cone Net Sphere Surface area Frustum

Summer 1	
PPES	**Chapter 16: Handling Data 2**
Assessment 2 x 90 minute PPES	**Assessment:** Chapter Test A
	Content: • Calculate estimated mean, modal class and class interval of the median for grouped data • Construct and interpret box plots • Construct and interpret cumulative frequency graphs • Compare spread using box plots • Construct scatter graphs and describe correlation • Make predictions based on the correlation (interpolation vs. extrapolation) • Construct time series graphs • Discuss any short term trends, seasonal variation and longer tem trends • Construct histograms • Solve frequency density problems using histograms
	Key Terms: Box plot Cumulative frequency Scatter graph Line of best fit Correlation Time series graph Trend (time series)

Summer 2	
Chapter 17: Calculations 2	**Chapter 18: Graphs 2**
Assessment: Chapter Test A	**Assessment:** Chapter Test A
Content: Convert in and out of index form - Solve calculations involving index laws (including roots, negatives, fractional indices) - - Simplify and manipulate surds - Solve calculations involving factions, surds and pi - Construction mapping diagrams for functions - Write the inverse of a function f(x) → f^{-1}(x) - Write and solve composite functions - Convert in and out of standard form - Solve calculations in standard form	**Content:** - Recognise and plot graphs of cubic functions - Recognise and plot graphs of reciprocal functions - Recognise and sketch graphs of exponential functions - Recognise and sketch trigonometric functions - To recognise and sketch translation and reflections of graphs - Draw and interpret non-standard graphs of real-life situations - Gradients and areas under graphs - Equation of a circle - Find the tangent to a circle at a point
Key Terms: Index Base Power Fractional index Negative index Reciprocal Root Surd Approximation Surd form Exact calculation Standard form	**Key Terms:** Quadratic function Cubic function Reciprocal function Exponential function Asymptote Trigonometric function Periodic Tangent to a curve

Year 11

Autumn 1	
Chapter 19: Pythagoras, Trigonometry and Vectors	
Assessment: Chapter A Test	

Content:
- Apply Pythagoras' theorem to find long sides
- Apply Pythagoras' theorem to find short sides

- Apply Pythagoras' theorem to find distance between two points

- Apply trigonometric ratios (sin/cos/tan) to find missing sides in right angle triangles
- Apply trigonometric ratios (sin/cos/tan) to find missing angles in right angle triangles

- Know the exact values of sinØ and cosØ for Ø= 0, 30,45,60,90 degrees
- Know the exact value of tan Ø for Ø= 0,30,45,60 degrees

- Apply the sine rule to find missing lengths and angles

- Apply the cosine rule to find missing lengths and sides

- Apply sine formula for the area of non right angle triangles

- Solve 3D Pythagoras' theorem and trigonometry problems

- Write column vectors and draw vector diagrams
- Add and subtract vectors
- Calculate multiples of vectors using a scalar

- Use vectors in geometric proofs

Key Terms	
Hypotenuse	Tangent ratio
Pythagoras theorem	Scalar
Adjacent	Vector
Opposite	Resultant
Sine ratio	Multiple
Cosine ratio	Collinear

Autumn 2		
PPES	**Chapter 20 Combined Events**	**Chapter 21: Sequences**
Assessment 2x 90 minute PPES	**Assessment: Chapter A Test**	**Assessment Chapter A Test**
	Content: • Arrange sets into Venn diagrams • Describe sets using Venn diagrams (intersection, union and complement) • Use Venn diagrams to record outcomes and calculate probabilities of events • Construct possibility (sample) space diagrams Calculate probabilities from sample space diagrams • Use tree diagrams to show the frequency or probabilities of two events • Use tree diagrams to calculate the probabilities of independent and dependent events • Calculate estimated outcomes using probabilities	**Content:** • Write sequence using term to term rule • Write sequences using position to term rule (nth rule) • Write the position to term rule (nth rule) for a linear sequence • Recognise special types of sequence (square, cube, triangular, arithmetic, geometric, Fibonacci and quadratic) • Find terms of quadratic sequence using term to term or position to term rule • Write the position to term rule (nth rule) for a quadratic sequence •
	Key Terms Set Member element Universal set Empty set Intersection ∩ Union ∪ **Key Terms** Sequence Term Position Term-to-term rule Position-to-term rule Linear/Arithmetic sequence Common difference Nth term Cube numbers Triangular numbers Geometric sequence Fibonacci-type sequence Quadratic sequence	

Spring 1

Chapter 22: Units and Proportionality

Assessment: Chapter A Test

Content:

- Calculations using standard and compound units (speed, density and pressure)

- Compare lengths, areas, and volumes of similar shapes
- Solve direct proportion problems

- Interpret the gradient of a straight line graph as a rate of change

- Solve inverse proportion problems

- Interpret graphs that illustrate direct and inverse proportion

- Set up, solve and interpret growth and decay problems

Key Terms
Rate
Proportion
Proportional
Direct proportion
Constant of proportionality
Inverse proportion
Varies

Spring 2		
PPES	**23: Algebraic Proofs**	**GCSE EXAM REVISION**
Assessment 2x 90minute PPES	**Assessment: N/A**	**Assessment** **NA**
	Builds Upon • Algebraic identities • Constructing mathematical arguments • Counter examples • LHS/RHS proofs • Odd/Even proofs	**Content:** Informed by QLAs and teacher led
	Key Terms: Identity Inequality Proof Equation Counter example Odd Even Left hand side Right hand side	**Key Terms:** **NA**

Summer 1	
GCSE EXAM REVISION	
Assessment **3 x 90 minute formal public exams**	
Content Content informed by QLAs and teacher led	
Key Terms	

Summer 2