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| **Year 11 Higher Curriculum Overview [2023-2024]** **Mathematics**  |
|  **Autumn Term** | **Knowledge & Understanding** | **Literacy Skills****Opportunities for****developing** **literacy skills** | **Employability Skills****[if any]** | **Assessment Opportunities** |
| **Composites** | **Components****[KEY concepts & subject specific vocab]** | **Formal Retrieval****[if any]** |
| **HT1** | **Unit 9 - Equations and inequalities** | * Find the roots of quadratic functions.
* Rearrange and solve simple quadratic equations.
* Solve more complex quadratic equations.
* Use the quadratic formula to solve a quadratic equation.
* Complete the square for a quadratic expression.
* Solve quadratic equations by completing the square.
* Solve simple simultaneous equations.
* Solve simultaneous equations for real-life situations.
* Use simultaneous equations to find the equation of a straight line.
* Solve linear simultaneous equations where both equations are multiplied.
* Interpret real-life situations involving two unknowns and solve them.
* Solve simultaneous equations with one quadratic equation.
* Use real-life situations to construct quadratic and linear equations and solve them.
* Solve inequalities and show the solution on a number line and using set notation.
 |  | * Key Vocabulary in Retrieval starters
* True and False Tasks
* Problem Solving Tasks
* Blooms Questioning Tasks
* GCSE problems as part of plenary – focus on key words
 | * Engineering
* Data analyst
* Games design
* Architect
* Sport scientists
 | * Plenary True and False Tasks
* Peer and self-assessment
* Feedback and reflective practise
* End of Topic Tests
 |
|  | **Unit 10 – Probability** | * Use the product rule for finding the number of outcomes for two or more events.
* List all the possible outcomes of two events in a sample space diagram.
* Identify mutually exclusive outcomes and events.
* Find the probabilities of mutually exclusive outcomes and events.
* Find the probability of an event not happening.
* Work out the expected results for experimental and theoretical probabilities.
* Compare real results with theoretical expected values to see if a game is fair.
* Draw and use frequency trees.
* Calculate probabilities of repeated events.
* Draw and use probability tree diagrams.
* Decide if two events are independent.
* Draw and use tree diagrams to calculate conditional probability.
* Draw and use tree diagrams without replacement.
* Use two-way tables to calculate conditional probability.
* Use Venn diagrams to calculate conditional probability.
* Use set notation.
 | * Retrieval in class starter
* Prior knowledge whiteboard questions
* End of Topic Unit Test Intervention lessons using knowledge organiser material
 | * Key Vocabulary in Retrieval starters
* True and False Tasks
* Problem Solving Tasks
* Blooms Questioning Tasks
* GCSE problems as part of plenary – focus on key words
 | * Gaming
* Statistician
 | * Plenary True and False Tasks
* Peer and self-assessment
* Feedback and reflective practise
* End of Topic Tests
* End of Term GCSE tests.
* Use of diagnostic questions and pre-tests to define prior knowledge
 |
|  | **Unit 11 - Multiplicative reasoning** | * Find an amount after repeated percentage changes.
* Solve growth and decay problems.
* Calculate rates.
* Convert between metric speed measures.
* Use a formula to calculate speed and acceleration.
* Solve problems involving compound measures.
* Use relationships involving ratio.
* Use direct and indirect proportion.
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* True and False Tasks
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* Blooms Questioning Tasks
* GCSE problems as part of plenary – focus on key words
 | * Scientist
* Engineer
 | * Plenary True and False Tasks
* Peer and self-assessment
* Feedback and reflective practise
* End of Topic Tests
* End of Term Tests
 |
| **HT2** | **Unit 12 – Similarity and congruence** | * Show that two triangles are congruent.
* Know the conditions of congruence.
* Prove shapes are congruent.
* Solve problems involving congruence.
* Use the ratio of corresponding sides to work out scale factors.
* Find missing lengths on similar shapes.
* Use similar triangles to work out lengths in real life.
* Use the link between linear scale factor and area scale factor to solve problems.
* Use the link between scale factors for length, area and volume to solve problems.
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* Prior knowledge whiteboard questions
* End of Topic Unit Test Intervention lessons using knowledge organiser material
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* True and False Tasks
* Problem Solving Tasks
* Blooms Questioning Tasks
* GCSE problems as part of plenary – focus on key words
 | * Architect
* Engineer
* Cartographer
* Car designer
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* Feedback and reflective practise
* End of Topic Tests
* End of Term Tests
 |
|  | **Unit 13 – More Trigonometry** | * Integers, Decimals, fractions, percentages, <, > and ≠ symbols
* Recognise, sketch and interpret graphs of the trigonometric functions (in degrees) y = sin x, y = cos x and y = tan x for angles of any size.
* Know the exact values of sin θ and cos θ for θ = 0°, 30°, 45°, 60° and 90° and exact value of tan θ for θ = 0°, 30°, 45° and 60° and find them from graphs.
* Apply to the graph of y = f(x) the transformations y = –f(x), y = f(–x) for sine, cosine and tan functions f(x).
* Apply to the graph of y = f(x) the transformations y = f(x) + a, y = f (x + a) for sine, cosine and tan functions f(x).
* Know and apply Area = ½ ab sin C to calculate the area, sides or angles of any triangle.
* Know the sine and cosine rules and use to solve 2D problems (including involving bearings).
* Use the sine and cosine rules to solve 3D problems. Calculate the length of a diagonal of a cuboid. Find the angle between a line and a plane.
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* Bespoke starters based on QLA of Mock Papers
* Prior knowledge whiteboard questions
* End of Topic Plenaries
* Bespoke Intervention lessons using knowledge organiser material and based on individual student gaps from the Mock exams
* Homework once a week online
 | * Key words – learned and understood
* Encourage use of subject language
* Questioning
* Pupil explanations and reasoning
* Engage with worded exam questions
* Encourage use of subject language
* Problem Solving Tasks
* GCSE problems as part of plenary – focus on key words
 | * Personal skills- Thinking and problem solving- Working together and communicating
* Fundamental skills- Using numbers effectively- Using language effectively

- Using a calculator effectively.**Possible Careers:**ScientistEngineer | * Plenary - GCSE question
* Peer and self-assessment
* Feedback and reflective practise
* End of Term GCSE Mock Exams
* Use of diagnostic questions and pre-tests to define prior knowledge

Baseline Assessment |
| **Unit 14 – Further Statistics** | * Understand how to take a simple random sample.
* Understand how to take a stratified sample.
* Draw and interpret cumulative frequency tables and diagrams.
* Work out the median, quartiles and interquartile range from a cumulative frequency diagram.
* Find the quartiles and the interquartile range from stem-and-leaf diagrams.
* Draw and interpret box plots.
* Understand frequency density.
* Draw histograms.
* Interpret histograms
* Compare two sets of data.
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Baseline Assessment |
| **Unit 15 Equations and Graphs** | * Solve simultaneous equations graphically.
* Represent inequalities on graphs.
* Interpret graphs of inequalities.
* Recognise and draw quadratic functions.
* Find approximate solutions to quadratic equations graphically.
* Solve quadratic equations using an iterative process.
* Find the roots of cubic equations.
* Sketch graphs of cubic functions.
* Solve cubic equations using an iterative.
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- Using a calculator effectively.**Possible Careers:**ScientistEngineerTeacher | * Plenary - GCSE question
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* End of Term GCSE Mock Exams
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Baseline Assessment |
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| **Spring****Term** | **Knowledge & Understanding** | **Literacy Skills****Opportunities for****developing** **literacy skills** | **Employability Skills****[if any]** | **Assessment Opportunities** |
| **Composites** | **Components****[KEY concepts & subject specific vocab]** | **Formal Retrieval****[if any]** |
| **HT3** | **Unit 16 – Circle Theorems** | * Solve problems involving angles, triangles and circles.
* Understand and use facts about chords and their distance from the centre of a circle.
* Solve problems involving chords and radii.
* Understand and use facts about tangents at a point and from a point.
* Solve angle and length problems involving circles and tangents.
* Understand, prove and use facts about angles subtended at the centre and the circumference of circles.
* Understand, prove and use facts about the angle in a semicircle.
* Understand, prove and use facts about angles subtended at the circumference of a circle.
* Understand, prove and use facts about cyclic quadrilaterals.
* Prove the alternate segment theorem.
* Solve angle problems using circle theorems.
* Find the equation of the tangent to a circle at a given point.
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Baseline Assessment |
|  | **Unit 17 – More Algebra** | * Change the subject of a formula where the power or root of the subject appears.
* Change the subject of a formula where the subject appears twice.
* Add and subtract algebraic fractions.
* Multiply and divide algebraic fractions.
* Change the subject of a formula involving fractions where all the variables are in the denominators.
* Simplify algebraic fractions.
* Add and subtract more complex algebraic fractions.
* Multiply and divide more complex algebraic fractions.
* Prove a result using algebra.
* Simplify expressions involving surds.
* Expand expressions involving surds.
* Rationalise the denominator of a fraction.
* Solve equations that involve algebraic fractions.
* Use function notation.
* Find composite functions.
* Find inverse functions.
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- Using a calculator effectively.**Possible Careers:**ScientistEngineerSoftware developerIT* Finance
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Baseline Assessment |
| **HT4** | **Unit 18 – Vectors and Geometric Proof** | * Understand and use vector notation.
* Work out the magnitude of a vector.
* Calculate using vectors and represent the solutions graphically.
* Identify when vectors are parallel.
* Calculate the resultant of two vectors.
* Solve problems using vectors.
* Use the resultant of two vectors to solve vector problems.
* Express points as position vectors.
* Prove lines are parallel.
* Prove points are collinear.
* Solve geometric problems in two dimensions using vector methods, including where vectors are divided in a given ratio.
* Apply vector methods for simple geometric proofs.
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- Using a calculator effectively.**Possible Careers:**ScientistEngineerSpace TravelArchitecture and design | * Plenary - GCSE question
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Baseline Assessment |
| **Unit 19 – Proportion and Graphs** | * Write and use equations to solve problems involving direct proportion.
* Write and use equations to solve problems involving direct proportion.
* Solve problems involving square and cubic proportionality.
* Write and use equations to solve problems involving inverse proportion.
* Use and recognise graphs showing inverse proportion.
* Recognise graphs of exponential functions.
* Sketch graphs of exponential functions.
* Match equations to graphs.
* Calculate the gradient of a tangent at a point.
* Estimate the area under a non-linear graph.
* Understand the relationship between translating a graph and the change in its function notation.
* Understand the effect reflecting a curve in one of the axes has on its function form.
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Baseline Assessment |
| **Structured revision with teachers depending on outcomes from mocks.****Revision of key topics** |  |  |  |  |