**GCSE Mathematics**

**Exam Board: Edexcel**

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| **Term**  | **INTENT** | **IMPLEMENTATION** | **IMPACT**  |
| **Substantive Knowledge**This is the specific, factual content for the topic, which should be connected into a careful sequence of learning. | **Disciplinary Knowledge (Skills)**This is the action taken within a particular topic in order to gain substantive knowledge. | **Assessment opportunities**What assessments will be used to measure student progress?Evidence of how well students have learned the intended content. |
| **Autumn Term****Y10****1A** | **Graphs**Straight Line GraphsQuadratic GraphsCubic GraphsReciprocal GraphsCircle GraphsDistance-Time GraphsVelocity-Time Graphs**Representations of data**Box PlotsHistograms | * Plot/draw graphs of the form y=mx+c
* Recognise equations of the form y=mx+c corresponds to straight-line
* Identify and interpret the gradient and y-intercept of a linear graph
* Identify and interpret gradient from ax+by=c
* Find equation of a line
* Draw and interpret distance-time graphs
* Draw and interpret velocity-time graphs
* Recognise a linear, quadratic, cubic, reciprocal and circle graph from its shape
* Find approximate solutions of a quadratic equation from the graph of the corresponding quadratic function
* Interpret graphs from real-life problems
* Recognise equation of the from x2+y2=r2 is a circle, centre (0,0) and radius r
* Produce box plots from raw data and when given quartiles, median and identify any outliers
* Interpret box plots to find median, quartiles, range and interquartile range and draw conclusions
* Construct and interpret histograms from class intervals with unequal width
* Use and understand frequency density
* Complete grouped frequency tables from Histograms
* Understand and define frequency density
* Estimate the mean/median from a histogram
 | Knowledge recall starter activityHomework to develop fluency, problem solving, reasoning and masteryTeacher assessment during lessonEnd of unit assessment via textbook |
| **Autumn Term****1B** | **Transformations**TranslationReflectionRotationEnlargement**Constructions**Plans and ElevationsBearingsConstructing trianglesPerpendicular BisectorAngle BisectorLoci**Quadratics**Quadratic EquationsQuadratic Inequalities | * Translate a given shape by a vector
* Recognise and describe single translations using column vectors on a coordinate grid
* Enlarge a shape on a grid without a centre specified
* Describe and transform 2D shapes using enlargements by a positive integer, positive fractional, and negative scale factor
* Enlarge a given shape using a given centre as the centre of enlargement by counting distances from centre, and find the centre of enlargement by drawing
* Recognise and describe rotations
* Rotate 2D shapes using the origin or any other point
* Identify the equation of a line of symmetry
* Recognise and describe reflections on a coordinate grid
* Reflect 2D shapes using specified mirror lines, including lines parallel to the axes and also y=x and y=-x
* Describe and transform 2D shapes using combined rotations, reflections, translations or enlargements
* Understand and draw front and side elevations and plans of shapes made from simple solids
* Given the front and side elevations and the plan of a solid, draw a sketch of the 3D solid
* Use and interpret maps and scale drawings, using a variety of scales and units
* Calculate bearings and solve bearings problems, including on scaled maps, and find/mark and measure bearings
* Construct Perpendicular bisector of a line segment
* Bisect a given angle
* Construct a region bounded by a circle and an intersecting line
* Construct a given distance from a point and a given distance from a line
* Construct equal distances from two points or two line segments
* Construct regions which may be defined by ‘nearer to’ or ‘greater than
* Use constructions to solve loci problems including with bearings
* Know that the perpendicular distance from a point to a line is the shortest distance to the line
* Find and describe regions satisfying a combination of loci, including in 3D
* Solve quadratic equations by factorisation
* Solve quadratic equations by completing the square
* Solve quadratic equations by using the quadratic formula
* Solve quadratic inequalities and display solution in set notation
 | Knowledge recall starter activityHomework to develop fluency, problem solving, reasoning and masteryTeacher assessment during lessonEnd of unit assessments via textbookEnd of term assessment |
| **Spring Term****2A** | **Trigonometry**Exact Trig ValuesTrigonometric GraphsArea of any triangleSine RuleCosine Rule3D Trigonometry | * 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 using special triangles
* Recognise properties, sketch and interpret graphs of sin, cos and tan
* 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 = 1/2 ab sin C to calculate the area of any triangle
* Know and apply Area = 1/2 ab sin C to calculate the sides or angles of any triangle
* Know the sine rule, and use to solve 2D problems (including involving bearings)
* Know the cosine rule, and use to solve 2D problems (including involving bearings)
* Use a combination of the sine and cosine rules to find missing lengths and angles
* Use the sine rule and cosine rule to solve 3D problems
* Solve geometrical problems on coordinate axes
 | Knowledge recall starter activityHomework to develop fluency, problem solving, reasoning and masteryTeacher assessment during lessonEnd of unit assessments via textbook |
| **Spring Term****2B** | **Probability**Sample SpaceVenn DiagramsTwo-Way TablesConditional ProbabilitiesTree Diagrams**Geometry**SimilarityCongruence**Equations and Graphs**Sketching graphsSimultaneous Equations graphicallyIteration | * Write probabilities using fractions, percentages or decimals
* Know that sum of probabilities of all outcomes is 1
* List all outcomes for single events, and combined events
* Compare experimental and theoretical probabilities
* Estimate number of times an event will occur, given the probability and the number of trials
* Find the probability of successive events, such as several throws of a single dice
* Draw sample space diagrams and use them for adding simple probabilities
* Work out probabilities from Venn diagrams to represent real-life situations
* Use union and intersection notation
* Use Venn Diagrams to calculate conditional probability
* Find a missing probability from a list or two-way table
* Use two-way table to calculate conditional probability
* Understand conditional probabilities and decide if two events are independent
* Draw probability tree diagram based on given information, and use this to find probability and expected number of outcome
* Understand selection with or without replacement
* Use a tree diagram to calculate conditional probability
* Understand and use SSS, SAS, ASA and RHS conditions to prove the congruence of triangles using formal arguments, and to verify standard ruler and pair of compasses constructions
* Solve angle problems by first proving congruence
* Understand similarity of triangles and of other plane shapes, and use this to make geometric inferences
* Understand the effect of enlargement on angles, perimeter, area and volume of shapes and solids
* Know the relationships between linear, area and volume scale factors of mathematically similar shapes and solids
* Use the relationship between enlargement and areas and volumes of simple shapes and solids
* Find missing lengths, areas and volumes in similar 3D solids
* Use formal geometric proof for the similarity of two given triangles
* Solve problems involving frustums of cones where you have to find missing lengths first using similar triangles
* Sketch a graph of a quadratic function, by factorising or by using the formula, identifying roots, y-intercept and turning point by completing the square
* Find approximate solutions to quadratic equations using a graph
* Solve simultaneous equations graphically
* Find graphically the intersection points of a given straight line with a circle
* Solve simultaneous equations representing a real-life situation graphically, and interpret the solution in the context of the problem
* Use iteration with simple converging sequences.
 | Knowledge recall starter activityHomework to develop fluency, problem solving, reasoning and masteryTeacher assessment during lessonEnd of unit assessments via textbook |
| **Summer Term****3A** | **Circles**Circle TheoremsCircle Geometry**FDP**FractionsDecimalsPercentagesRatioProportion | * Recall the definition of a circle and identify (name) and draw parts of a circle, including sector, tangent, chord, segment
* Understand and use the fact that the tangent at any point on a circle is perpendicular to the radius at that point
* Prove and use the facts of all circle theorems
* Recognise and construct the graph of a circle using x2 + y2 = r2 for radius r centred at the origin of coordinates
* Find the equation of a tangent to a circle at a given point
* Add, subtract, multiply and divide fractions
* Convert a fraction to a recurring decimal and vice versa.
* Convert between fractions, decimals and percentages
* Work out a percentage increase or decrease, including: simple interest, income tax calculations, value of profit or loss, percentage profit or loss
* Write ratios in their simplest form, including three-part ratios
* Write a ratio as a fraction
* Identify direct proportion from a table of values, by comparing ratios of values
* Convert between currencies
 | Knowledge recall starter activityHomework to develop fluency, problem solving, reasoning and masteryTeacher assessment during lessonEnd of unit assessments via textbook |
| **Summer Term****3B** | **Algebra**Algebraic FractionsAlgebraic ProofFunctionsRearranging formulae**Surds**SimplifyingOperationsRationalising the denominator | * Simplify algebraic fractions
* Multiply and divide algebraic fractions
* Change the subject of a formula
* Solve ‘Show that’ and proof questions using consecutive integers , squares, even numbers, odd numbers
* Rationalise the denominator involving surds
* Use function notation
* Find the inverse of a function
* Find composite functions
 | Knowledge recall starter activityHomework to develop fluency, problem solving, reasoning and masteryTeacher assessment during lessonEnd of unit assessments via textbookEnd of year assessments |