**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**  **Y11**  **1A** | **Geometry** Vectors Geometric Proofs  **Algebra** Reciprocal Graphs  Exponential Graphs  Gradient and Area under graphs  Direct and Inverse Proportion | • Understand and use vector notation, including column notation  • Understand that 2a is parallel to a and twice its length, and that a is parallel to –a in the opposite direction.  • Represent vectors, combinations of vectors and scalar multiples in the plane pictorially.  • Calculate the sum of two vectors, the difference of two vectors and a scalar multiple of a vector using column vectors (including algebraic terms).  • Find the length of a vector using Pythagoras’ Theorem.  • Calculate the resultant of two vectors.  • Find the length of a vector using Pythagoras’ Theorem.  • Calculate the resultant of two vectors.  • Produce geometrical proofs to prove points are collinear and vectors/lines are parallel.  • Recognise, sketch and interpret graphs of the reciprocal function y = 1/x with x ≠ 0  • State the value of x for which the equation is not defined;  • Recognise, sketch and interpret graphs of exponential functions y = kx for positive values of k and integer values of x;  • Interpret and analyse transformations of graphs of functions and write the functions algebraically, e.g. write the equation of f(x) + a, or f(x – a):  • apply to the graph of y = f(x) the transformations y = –f(x), y = f(–x) for linear, quadratic, cubic functions;  • apply to the graph of y = f(x) the transformations y = f(x) + a, y = f(x + a) for linear, quadratic, cubic functions;  • Estimate area under a quadratic or other graph by dividing it into trapezia;  • Interpret the area under a linear or non-linear graph in real-life contexts;  • Interpret the gradient of non-linear graph in curved distance–time and velocity–time graphs:  • Interpret the gradient of a linear or non-linear graph in financial contexts;  • Interpret the rate of change of graphs of containers filling and emptying;  • Interpret the rate of change of unit price in price graphs.  • Recognise and interpret graphs showing direct and inverse proportion;  • Identify direct proportion from a table of values, by comparing ratios of values, for x squared and x cubed relationships;  • Set up and use equations to solve word and other problems involving direct proportion;  • Use y = kx to solve direct proportion problems, including questions where students find k, and then use k to find another value;  • Solve problems involving inverse proportionality; | •Knowledge recall starter activity  •Homework to develop fluency, problem solving, reasoning and mastery  •Teacher assessment during lesson  •Unit revision exercise via textbook  •Mymaths mastery homework  •End of unit assessments |
| **Autumn Term**  **1B** | **Geometry** Interior/Exterior Angles  Trigonometry  Area/Perimeter of Circles  Surface Area  Volume | • Understand the difference between regular and irregular polygons • Use the sum of interior angles to find missing angles of polygons  • Use the sum of exterior angles to find missing angles  • Use sum of exterior angles to find how many sides a regular polygon has  • Use SOHCAHTOA to find a missing angle in a right-angled triangle  • Find angles of elevation and depression  • Use SOHCAHTOA to find a missing side in a right-angled triangle  • Derive the exact values of sin, cos and tan for the following angles: 0, 30, 45, 60 and 90  • Calculate with exact values  • Name parts of a circle • Find the circumference of a circle • Find the radius/diameter when given the circumference  • Find the area of a circle  • Find the radius/diameter when given the area  • Find the area of compound shapes that involved circles  • Find arc length of a sector  • Find the area of a sector  • Find the radius/diameter when given the arc length or area of a sector  • Identify and sketch 3D shapes  • Identify planes of symmetry  • Find the surface area of prisms (cube, cuboid, triangular)  • Find the surface area of cylinders  • Find the surface area of spheres  • Find the surface area of pyramids  • Find the surface area of cones  • Find the volume of prisms (cube, cuboid, triangular, cylinder)  • Find the volume of spheres  • Find the volume of pyramids  • Find the volume of cones  • Find the volume of frustums  • Solve problems that involve surface area  • Solve problems that involve volume | •Knowledge recall starter activity  •Homework to develop fluency, problem solving, reasoning and mastery  •Teacher assessment during lesson  •Unit revision exercise via textbook  •Mymaths mastery homework  •End of unit assessments  •December Trial Exams |
| **Spring Term**  **2A** | **Number** Indices  Standard Fom  Combinations  Error Intervals/Truncating  **Algebra** Linear Sequences  Quadratic Sequences  Geometric Sequences | • State and apply the laws of indices  • Simplify an expression involving indices  • State and apply the definitions of zero and negative indices  • Express and compare numbers in standard form  • Calculate using numbers in standard form  •Calculate upper and lower bounds of numbers due to rounding and truncating  •Use upper and lower bounds in calculations  • Recognise number patterns and sequences  • Find the terms of a sequence using a term-to-term rule  • Recognise arithmetic and geometric sequences  • Find terms of a sequence using a position-to-term rule  • Find the formula for the general (nth) term of a sequence  • Solve problems involving number patterns and sequence | •Knowledge recall starter activity  •Homework to develop fluency, problem solving, reasoning and mastery  •Teacher assessment during lesson  •Unit revision exercise via textbook  •Mymaths mastery homework  •End of unit assessments |
| **Spring Term**  **2B** | **Revision** Recap prior topics  Develop exam skills  Enhance problem solving | •Ensure students have a solid grasp of fundamental principles and theories  •Practice solving a variety of problems to enhance analytical and logical reasoning skills  •Be proficient in rearranging and solving different types of equations  • Recap how to read and interpret data from various types of graphs and charts  • Develop quick mental calculation abilities for basic operations  • Master simplifying expressions, expanding brackets, and factorising  • Understand properties of shapes, theorems and proofs  • Recap how to compute and interpret measures of central tendency and spread  • Enhance ability to follow and construct logical arguments and proofs  • Practice pacing during exams and working efficiently under time constraints  •Develop the ability to identify and learn from mistakes in practice problems  • Get comfortable with using calculators efficiently | •Knowledge recall starter activity  •Homework to develop fluency, problem solving, reasoning and mastery  •Teacher assessment during lesson  •Unit revision exercise via textbook  •Mymaths mastery homework  •End of unit assessments  •February Trial Exams |
| **Summer Term**  **3A** | **Revision** Recap prior topics  Develop exam skills  Enhance problem solving | •Ensure students have a solid grasp of fundamental principles and theories  •Practice solving a variety of problems to enhance analytical and logical reasoning skills  •Be proficient in rearranging and solving different types of equations  • Recap how to read and interpret data from various types of graphs and charts  • Develop quick mental calculation abilities for basic operations  • Master simplifying expressions, expanding brackets, and factorising  • Understand properties of shapes, theorems and proofs  • Recap how to compute and interpret measures of central tendency and spread  • Enhance ability to follow and construct logical arguments and proofs  • Practice pacing during exams and working efficiently under time constraints  •Develop the ability to identify and learn from mistakes in practice problems  • Get comfortable with using calculators efficiently | •Knowledge recall starter activity  •Homework to develop fluency, problem solving, reasoning and mastery  •Teacher assessment during lesson  •Unit revision exercise via textbook  •Mymaths mastery homework  •End of unit assessments |