

Beths Grammar School KS5 Mathematics Curriculum Map – Year 13

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 1A Year 13	<u>PURE – Year 2</u> <u>Chapter 4: Binomial Expansion</u> 4.1 Expanding $(1 + x)^n$ 4.2 Expanding $(a + bx)^n$ 4.3 Using Partial Fractions <u>Chapter 9: Differentiation</u> 9.1 Differentiating $\sin x$ and $\cos x$ 9.2 Differentiating Exponentials and Logarithms 9.3 The Chain Rule 9.4 The Product Rule 9.5 The Quotient Rule 9.6 Differentiating Trigonometric Functions 9.7 Parametric Differentiation 9.8 Implicit Differentiation 9.9 Using Second Derivatives 9.10 Rates of Change <u>Chapter 8: Parametric Equations</u> 8.1 Parametric Equations 8.2 Using Trigonometric Identities 8.3 Curve Sketching 8.4 points of Intersection 8.5 Modelling with Parametric Equations	<u>PURE – Year 2</u> <u>Chapter 4: Binomial Expansion</u> - Expand $(1+x)^n$ for any rational constant n and determine the range of values of x for which the expansion is valid - Expand $(a + bx)^n$ for any rational constant n and determine the range of values of x for which the expansion is valid - Use partial fractions to expand fractional expressions <u>Chapter 9: Differentiation</u> - Differentiate trigonometric functions - Differentiate exponentials and logarithms - Differentiate functions using the chain, product and quotient rules - Differentiate parametric equations - Differentiate functions which are defined implicitly - Use the second derivative to describe the behaviour of a function - Solve problems involving connected rates of change and construct simple differential equations <u>Chapter 8: Parametric Equations</u> - Convert parametric equations into Cartesian form by substitution - Convert parametric equations into Cartesian form using trigonometric identities - Understand and use parametric equations of curves and sketch parametric curves - Solve coordinate geometry problems involving parametric equations - Use parametric equations in modelling in a variety of contexts	- In class teacher assessment through Q&A - End of chapter mini test (with peer marking) - Chapter revision exercise via textbook - End of term review exercises via textbook - End of term formal mixed chapter assessment - Mymaths topic codes: <u>PURE – Year 2</u> 4.2: 2204, 2204 4.3: 2205, 2205 Review chapter 4: 3007 9.2: 2161 9.3: 2162 9.4: 2163 9.5: 2164 9.6: 2165, 2272 9.7: 2222 9.8: 2223 9.9: 2271 9.10: 2166 Revision chapter 9: 3005, 3036 8.1: 2224 8.2: 2262 8.3: 2224 Review 8.1-3: 3037

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Autumn Term 1B Year 13	<u>Chapter 3: Sequences and Series</u> • 3.1 Arithmetic Sequences • 3.2 Arithmetic Series • 3.3 Geometric Sequences • 3.4 Geometric Series • 3.5 Sum to Infinity • 3.6 Sigma Notation • 3.7 Recurrence Relations • 3.8 Modelling with Series <u>Chapter 10: Numerical Methods</u> • 10.1 Locating Roots • 10.2 Iteration • 10.3 The Newton-Raphson Method • 10.4 Applications to Modelling <u>Chapter 11: Integration</u> • 11.1 Integrating Standard Functions • 11.2 Integrating $f(ax + b)$ • 11.3 Using Trigonometric Identities • 11.4 Reverse Chain Rule • 11.5 Integration by Substitution • 11.6 Integration by Parts • 11.7 Partial Fractions • 11.8 Finding Areas • 11.9 The Trapezium Rule • 11.10 Solving Differential Equations • 11.11 Modelling with Differential Equations	<u>Chapter 3: Sequences and Series</u> • Find the n^{th} term of an arithmetic sequence • Prove and use the formula for the sum of the first n terms of an arithmetic series • Find the n^{th} term of a geometric sequence • Prove and use the formula for the sum of a finite geometric series • Prove and use the formula for the sum to infinity of a convergent geometric series • Use sigma notation to describe series • Generate sequences from recurrence relations • Model real-life situations with sequences and series <u>Chapter 10: Numerical Methods</u> • Locate roots of $f(x) = 0$ by considering changes of sign • Use iteration to find an approximation to the root of the equation $f(x) = 0$ • Use the Newton-Raphson procedure to find approximations to the solutions of the equations of the form $f(x) = 0$ • Use numerical methods to solve problems in context <u>Chapter 11: Integration</u> • Integrate standard mathematical functions including trigonometric and exponential functions and use the reverse chain rule to integrate functions of the form $f(ax + b)$ • Use trigonometric identities in integration • Use the reverse chain rule to integrate more complex functions • Integrate functions by making a substitution, using integration by parts and using partial fractions • Use integration to find the area under a curve • Use the trapezium rule to approximate the area under a curve • Solve simple differential equations and model real-life situations with differential equations	• In class teacher assessment through Q&A • End of chapter mini test (with peer marking) • Chapter revision exercise via textbook • End of term review exercises via textbook • End of term formal assessments • Mastery homework with use of mymaths.co.uk • Mymaths topic codes: 3.2: 2039 3.4: 2040 3.6: 2038 3.7: 2264 10.1: 2173 10.2: 2174 10.3: 2176 Chapter 10 revision: 3047 11.1: 2167 11.2: 2168, 2170 11.3: 2218 11.4: 2216 11.5: 2219, 2169 11.6: 2171, 2220 11.7: 2217, 2221 11.9: 2060 11.11: 2226, 2227 Chapter 11 revision: 3028,
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	11.12 Integration as the Limit of a Sum <u>Chapter 12: Vectors</u> 12.1 3D coordinates 12.2 Vectors in 3D 12.3 Solving Geometric Problems 12.4 Application to Mechanics <u>MECHANICS – Year 2</u> <u>Chapter 5: Forces and Friction</u> 5.1 Resolving Forces 5.2 Inclined Planes 5.3 Friction	<u>Chapter 12: Vectors</u> - Understand 3D Cartesian coordinates - Use vectors in three dimensions - Use vectors to solve geometric problems - Model 3D motion in mechanics with vectors <u>MECHANICS – Year 2</u> <u>Chapter 5: Forces and Friction</u> - Resolve forces into components - Use the triangle law to find a resultant force - Solve problems involving smooth or rough inclined planes - Understand friction and the coefficient of friction - Use $F \leq \mu R$	3046, 3038 12.2: 2208 End of Year 2 Review: 3031 <u>MECHANICS – Year 2</u> 5.1: 2190 5.2: 2191, 2192 5.3: 2193, 2194 Chapter 5 revision: 3034, 3035
Spring Term 2A Year 13	<u>STATISTICS – Year 2</u> <u>Chapter 1: Regression, Correlation and Hypothesis testing</u> 1.1 Exponential Models 1.2 Measuring Correlation 1.3 Hypothesis testing for Zero Correlation <u>Chapter 2: Conditional Probability</u> 2.1 Set Notation 2.2 Conditional Probability 2.3 Conditional Probabilities in Venn diagrams 2.4 Probability Formulae 2.5 Tree Diagrams	<u>STATISTICS – Year 2</u> <u>Chapter 1: Regression, Correlation and Hypothesis Testing</u> - Understand exponential models in bivariate data - Use a change of variable to estimate coefficients in an exponential model - Understand and calculate the product moment correlation coefficient - Carry out a hypothesis test for zero correlation <u>Chapter 2: Conditional Probability</u> - Understand set notation in probability - Understand conditional probability - Solve conditional probability problems using two-way tables and Venn diagrams - Use probability formulae to solve problems - Solve conditional probability using tree diagrams	- In class teacher assessment through Q&A - End of chapter mini test (with peer marking) - Chapter revision exercise via textbook - End of term review exercises via textbook - End of term formal assessments - Mastery homework with use of mymaths.co.uk - Mymaths topic codes: <u>STATISTICS – Year 2</u> 1.3: 2287 Chapter 2 revision: 3251

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	<u>MECHANICS – Year 2</u> <u>Chapter 4: Moments</u> 4.1 Moments 4.2 Resultant Moments 4.3 Equilibrium 4.4 Centres of Mass 4.5 Tilting <u>Chapter 7: Applications of Forces</u> 7.1 Static Particles 7.2 Modelling with Statics 7.3 Friction and Static Particles 7.4 Static Rigid Bodies 7.5 Dynamics and Inclined Planes 7.6 Connected Particles	<u>MECHANICS – Year 2</u> <u>Chapter 4: Moments</u> - Calculate the turning effect of a force applied to a rigid body - Calculate the resultant moment of a set of forces acting on a rigid body - Solve problems involving uniform rods in equilibrium - Solve problems involving non-uniform rods - Solve problems involving rods on the point of tilting <u>Chapter 7: Applications of Forces</u> - Find an unknown force when a system is in equilibrium - Solve statics problems involving weight, tension and pulleys - Understand and solve problems involving limiting equilibrium - Solve problems involving motion on rough or smooth inclined planes - Solve problems involving connected particles that require the resolution of force	<u>MECHANICS – Year 2</u> 4.3: 2197, 3040
Spring Term 2B Year 13	<u>STATISTICS – Year 2</u> <u>Chapter 3: The Normal Distribution</u> 3.1 The Normal Distribution 3.2 Finding Probabilities for Normal Distributions 3.3 The Inverse Normal Distribution function 3.4 The Standard Normal Distribution 3.5 Finding μ and σ 3.6 Approximating a binomial Distribution 3.7 Hypothesis testing with the Normal Distribution	<u>STATISTICS – Year 2</u> <u>Chapter 3: The Normal Distribution</u> - Understand the normal distribution and the characteristics of a normal distribution curve - Find percentage points on a standard normal curve - Calculate values on a standard normal curve - Find unknown means and/or standard deviations for a normal distribution - Approximate a binomial distribution using a normal distribution - Select appropriate distributions and solve real-life problems in context - Carry out a hypothesis test for the mean of a normal distribution	- In class teacher assessment through Q&A - End of chapter mini test (with peer marking) - Chapter revision exercise via textbook - End of term review exercises via textbook - End of term formal assessments - Mastery homework with use of mymaths.co.uk - Mymaths topic codes:

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	<u>MECHANICS – Year 2</u> <u>Chapter 6: Projectiles</u> 6.1 Horizontal Projection 6.2 Horizontal and Vertical Components 6.3 Projection at any angle 6.4 Projectile Motion Formulae <u>Chapter 8: Further Kinematics</u> 8.1 Vectors in Kinematics 8.2 Vector methods with projectiles 8.3 Variable acceleration in one Dimension 8.4 Differentiating Vectors 8.5 Integrating Vectors	<u>MECHANICS – Year 2</u> <u>Chapter 6: Projectiles</u> - Model motion under gravity for an object projected horizontally - Resolve velocity into components - Solve problems involving particles projected at an angle - Derive the formulae for time of flight, range and greatest height, and the equation of the path of a projectile <u>Chapter 8: Further Kinematics</u> - Work with vectors for displacement, velocity and acceleration when using the vector equations of motion - Use calculus with harder functions of time involving variable acceleration - Differentiate and integrate vectors with respect to time	<u>STATISTICS – Year 2</u> 3.1: 2120(Q1) 3.2: 2121 3.3: 2292 3.4: 2120(Q2) 3.6: 2286 3.7: 2288 Chapter 3 revision: 3020 <u>MECHANICS – Year 2</u> 6.1: 6.2: 2198 6.3: 2199,3041 8.1: 2290 8.3: 3254 8.4: 2291
Summer Term 3A Year 13	Revision and Exams	Exam Technique and Exam Questions	
Summer Term 3B Year 13	Exams		