Sir Thomas Fremantle

Year 11 Curriculum: Maths

Foundation Tier

Rationale	As maths continues to be building blocks of skills and knowledge, at Key Stage 4 we continue to develop numeracy and problem-solving skills in preparation for their GCSEs. GCSE Mathematics involves higher order thinking skills, where students have to apply their knowledge in a variety of practical contexts, as well as find cross topic links. We follow the AQA GCSE 8300 specification, which has two tiers, Foundation and Higher. The two tiers are on separate curriculum maps below.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Knowledge	Probability Apply knowledge of randomness, likeliness and fairness to events Calculate expected outcomes in experiments, including future extended experiments	Scatter Graphs Plot and interpret scatter graphs Draw and use a line of best fit Solving Inequalities Recall methods on solving linear equations of varying difficulty	Algebra and Graphs Solve linear equations with non-integer values and negative numbers, including those with brackets and unknowns on both sides Plot linear equations graphically and calculate solutions	Quadratic Equations and Graphs Recall methods of expanding and factorising quadratic expressions Solve simple quadratic equations and those required to factorise	Revision Programme Recall of all topics - focus on gaps identified during mocks	Study Leave

	Calculate relative frequency from lists and tables Compare between theoretical and experimental Use appropriate language linked to the probability scale Use knowledge of relative frequency to determine bias Discuss how increasing sampling of trials tends towards theoretical probability Understand and use notation linked to probability To display information in Venn diagrams and evaluate them To represent sets of data in two-way tables, lists, tree diagrams, sample	Understand notation with inequalities Solve inequalities on a number line Solve linear inequalities Simultaneous Equations Solve linear simultaneous equations through elimination typically $ax + by = c$ Understand simultaneous equations graphically and estimate solutions Formulate simultaneous equations given a context Algebra and Graphs Form equations and construct graphs in context Trigonometry Introduce the	Forming equations from written context, or other areas within mathematics such as angles, area and perimeter Problem solving contexts involving simple simultaneous equations Direct and Inverse Proportion Use proportion to solve problems using informal strategies or the unitary method of solution Use direct proportion to solve geometrical problems Calculate an unknown quantity from quantities that vary in direct or inverse proportion Set up and use equations to solve word and other problems involving direct proportion or	Recognise the difference of two squares Recall methods of plotting quadratic graphs Identify and interpret roots of quadratic functions graphically Vectors Use and understand vector notation Calculate and represent graphically the sum of two vectors, the difference of two vectors and a scalar multiple of a vector Calculate the resultant of two vectors		

	space diagrams Calculate the probability of independent combined events using sample space diagrams and tree diagrams Calculate the probability of dependent combined events and suitably use diagrams to represent these **Volume** Compare lengths, areas and volumes Use apple and evaluate scale factors Use and explore volume and similarity Know and apply the formulas to calculate the volume or cubes and cuboids Know and apply the formulas to calculate the volumes of	trigonometric ratios SOH, CAH, TOA Use trigonometric ratios to find missing angles and missing sides Know the exact values of sin 30°, 45°, 60°, 90° ; cos 30°, 45°, 60°, 90° ; tan 0°, 30°, 45°, 60° ; Compare lengths using ratios and link to trigonometric ratios	inverse proportion Relate algebraic solutions to graphical representation of the equations Sketch graphs to represent real-life situations Recognise graphs that represent direct and inverse proportion Understand that an equation of the form $y = kx$ represents direct proportion and that k is the constant of proportionality Understand that an equation of the form $y =$ represents inverse proportion and that k is the constant of proportionality. Recall the meaning of the gradient and how to calculate it			

	prisms, including cylinders Use the formulas for cones, pyramids and spheres to calculate their volumes Calculate volumes of composite solids and using exact values of pi **Quadratics and Rearranging** Interpret simple expressions as functions with inputs and outputs Understand and used standard mathematical formulae Rearrange the formulae to change the subject Simplify and manipulate expressions including recalling the laws of indices Expand bracket and		Recognise that gradient represents the rate of change on real – life graphs **Sketching Graphs** Recall methods of drawing, sketching and interpreting linear functions Calculate values for quadratic functions leading to drawing quadratic graphs Recognise and interpret quadratic graphs Calculate, draw, sketch and recognise basic cubic functions Understand what is meant by reciprocal and recognise the properties of reciprocal graphs Growth and Decay Solve problems involving repeated proportional change		

	factorise expressions - both linear and quadratic Use algebra to demonstrate and solve problems in context <u>Pythagoras</u> Know and recall Pythagoras' theorem Find missing lengths using Pythagoras' theorem Solve problems involving Pythagoras' theorem		Use calculators to explore exponential growth and decay using a multiplier and the power Solve compound interest problems		

Skills	Across all of the topics covered in Year 11, we develop the following skills which are examined in the GCSE assessment objectives.				

AO1	**AO2**	**AO3**
I can accurately recall facts	I can accurately carry out routine procedures	I can translate problems in mathematical or non-mathematical contexts
I can recall key terminology and definitions	I can make deductions, inferences and draw conclusions from mathematical information	I can make and use connections between different strands of mathematics
I can use and interpret notation correctly	I can interpret and communicate information accurately	I can interpret results of the given problem
	I can construct chains of reasoning to achieve a given result	I can evaluate methods used and results obtained
	I can present arguments and proof	I can assess and evaluate arguments
	I can present information and methods clearly including multi-step problems	I can conclude contextual problems using abstract calculations and proof

Assessment	Autumn Mock - All three papers for full Maths GCSE	Spring Mock - All three papers for full Maths GCSE	External Exam - GCSE

Characteristics	Problem Solving Committed Adaptable Critical Thinker
	Inquisitive Realistic Risk Taker
	Organised Enthusiastic

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Year 11 Curriculum: Maths

Higher Tier

Rationale	As maths continues to be building blocks of skills and knowledge, at Key Stage 4 we continue to develop numeracy and problem-solving skills in preparation for their GCSEs. GCSE Mathematics involves higher order thinking skills, where students have to apply their knowledge in a variety of practical contexts, as well as find cross topic links. We follow the AQA GCSE 8300 specification, which has two tiers, Foundation and Higher. The two tiers are on separate curriculum maps below.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Knowledge	Basic Probability Complete frequency tables for experimental probability Understand and use relative frequency Complete frequency	Quadratics and Rearranging Interpret simple expressions as functions with inputs and outputs Understand and used standard	Simultaneous Equations Solve linear simultaneous equations through elimination typically ax + by = c Understand simultaneous	Sine and Cosine Rules Identify the sine and cosine rules To be able to use and rearrange the formulas	Revision Programme Recall of all topics - focus on gaps identified during mocks	Study Leave

	trees in a given context Understand mutually exclusive outcomes and how they add up to 1 Construct theoretical probability possibility spaces Probability Apply knowledge of randomness, likeliness and fairness to events Calculate expected outcomes in experiments, including future extended experiments Calculate relative frequency from lists and tables Compare between theoretical and experimental Use appropriate language linked to the probability scale	mathematical formulae Rearrange the formulae to change the subject Simplify and manipulate expressions including recalling the laws of indices Expand bracket and factorise expressions - both linear and quadratic Use algebra to demonstrate and solve problems in context Use Algebra to prove or demonstrate if something is true or false Quadratic Equations and Graphs Recall methods of expanding and factorising quadratic expressions	equations graphically and estimate solutions Formulate simultaneous equations given a context Equation of a Circle Recognise and use the equation of a circle with the centre at (0,0) Find the equation of the tangent to the circle at a given point Identify the standard circle theorems Circle Theorems Apply the standard circle theorems, exploring angles, tangents, chords and radii Prove the use of standard circle theorems through reasoning Solving Inequalities	To be able to apply the sine and cosine rules in context problems Transformations To be able to to recall key features of linear, quadratic and cubic graphs To be able to identify translation transformations and the impact on the equation of the function To be able to recognise stretches in the y-axis and x-axis Vectors Use and understand vector notation Calculate and represent graphically the sum of two vectors, the difference of two vectors and a scalar multiple of a vector Calculate the		

	Use knowledge of relative frequency to determine bias Discuss how increasing sampling of trials tends towards theoretical probability Understand and use notation linked to probability To display information in Venn diagrams and evaluate them To represent sets of data in two-way tables, lists, tree diagrams, sample space diagrams Calculate the probability of independent combined events using sample space diagrams and tree diagrams Calculate the	Solve simple quadratic equations and those required to factorise Recognise the difference of two squares Recall methods of plotting quadratic graphs Identify and interpret roots of quadratic functions graphically Further Equations and Graphs Solve linear equations with non-integer values and negative numbers, including those with brackets and unknowns on both sides Plot linear equations graphically and calculate solutions Forming equations from written context,	Recall methods on solving linear equations of varying difficulty Understand notation with inequalities Solve inequalities on a number line Solve linear inequalities in context Display inequalities graphically	resultant of two vectors Pre-Calculus Area under the curve Calculate the area under a graph Use the area of trapeziums to estimate the area under a curve To be able to interpret the representation of area under the curve		

	probability of dependent combined events and suitably use diagrams to represent these **2D representations of 3D Shapes** Construct net of 3D shapes Draw plans and elevations of 3D objects Draw 3D shapes on isometric paper **Geometric Proof** Look at geometric problems and how we can structure proof demonstrations **Volume** Compare lengths, areas and volumes Use apple and evaluate scale factors Use and explore volume and similarity	or other areas within mathematics such as angles, area and perimeter Problem solving contexts involving simple simultaneous equations Solve quadratic equations by factorising, completing the square or using the quadratic formula. Solve geometric problems that lead to quadratic equations that need to be solved Plot quadratic equations and estimate solutions from graphs **Sketching Graphs** Recall methods of drawing, sketching and interpreting linear functions				

	Know and apply the formulas to calculate the volume or cubes and cuboids Know and apply the formulas to calculate the volumes of prisms, including cylinders Use the formulas for cones, pyramids and spheres to calculate their volumes Calculate volumes of composite solids and using exact values of pi	Recall methods of drawing, sketching and interpreting quadratic functions Calculate, , draw, sketch and recognise cubic functions in the where k is an integer Understand what is meant by reciprocal and recognise the properties of reciprocal graphs Draw, sketch, recognise and interpret graphs of the form $y = k^x$ for positive values of k Know the shapes of the graphs of functions y = sin x , y = cos x and y = tan x			

Skills	Across all of the topics covered in Year 11, we develop the following skills which are examined in the GCSE assessment objectives.		
	AO1	**AO2**	**AO3**
	I can accurately recall facts I can recall key terminology and definitions I can use and interpret notation correctly	I can accurately carry out routine procedures I can make deductions, inferences and draw conclusions from mathematical information I can interpret and communicate information accurately I can construct chains of reasoning to achieve a given result I can present arguments and proof I can present information and methods clearly including multi-step problems	I can translate problems in mathematical or non-mathematical contexts I can make and use connections between different strands of mathematics I can interpret results of the given problem I can evaluate methods used and results obtained I can assess and evaluate arguments I can conclude contextual problems using abstract calculations and proof
Assessment	Autumn Mock - All three papers for full Maths GCSE	Spring Mock - All three papers for full Maths GCSE	External Exam - GCSE

Characteristics	Problem Solving Committed Adaptable Critical Thinker
	          Inquisitive Realistic Risk Taker
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