



Maths Department – Curriculum Intent

Overview of KS3 Curriculum			
		Subject: Maths	Head of Department: Mr D Penney
	Year 7	Year 8	Year 9
Autumn Term	<p>1. Analysing and Displaying Data Finding the mean, median and mode. Displaying data using graphs and tables.</p> <p>2. Number skills Order of operations. All four operations. Money and time. Negative numbers. Factors, multiples and primes</p> <p>3. Expressions, functions and formulae Functions. Simplifying expressions. Writing expressions. Substituting into formulae. Writing formulae. Solve one and two step equations</p> <p>4. Decimals and measures Decimals and rounding. Length, mass and capacity. Scales and measures. Working with decimals mentally. Perimeter. Area. Units of measure.</p> <p>Career Links: Data Analyst, Statistician, Sports Performance Analyst, Engineering, Architect.</p>	<p>1. Number Written and mental methods for addition/subtraction/multiplication/division. Know divisibility rules. Negative numbers. Powers, roots and brackets. Product of prime factors.</p> <p>2. Area and Volume Area of a triangle. Area of a parallelogram and trapezium. Volume of cubes and cuboids. 2D representations of 3D solids. Surface area of cubes and cuboids. Measures.</p> <p>3. Statistics, graphs and charts Pie charts. Using tables. Stem and Leaf diagrams. Comparing data. Scatter graphs. Misleading graphs.</p> <p>4. Expressions and equations Algebraic powers. Expressions and brackets. Factorising expressions. Writing expressions. Substituting into formulae. Writing formulae. One and two step equations.</p> <p>Career Links: Data Analyst, Statistician, Sports Performance Analyst, Accounting and Finance, Engineering.</p>	<p>1. Indices and standard form Indices. Calculations and estimates. Standard form.</p> <p>2. Expressions and formulae Factorising expressions. Solving equations. Substituting into expressions. Writing and using formulae. Using and rearranging formulae. Index laws and brackets. Expanding double brackets. Factorise quadratics with first coefficient 1.</p> <p>3. Dealing with data Probability. Planning a survey. Collecting data. Calculating averages. Displaying and analysing data. Presenting and comparing data.</p> <p>4. Multiplicative reasoning Enlargement. Negative and fractional scale factors. Percentage change. Compound measures. Direct and inverse proportion.</p> <p>Career Links: Data Analyst, Statistician, Meteorologist, Accounting and Finance, Engineering.</p>
Spring Term	<p>5. Fractions and percentages Comparing fractions. Simplifying fractions. Working with fractions. Fractions and decimals. Understanding percentages. Percentages of amounts.</p> <p>6. Probability The language of probability. Calculating probability. Experimental probability. Expected outcomes.</p>	<p>5. Straight-line graphs Gradients. Equations of straight lines.</p> <p>6. Decimals and ratio Ordering decimals. Rounding. Calculations with decimals. Ratio and proportion with decimals.</p>	<p>5. Constructions Using scales. Basic constructions Constructing triangles. Using accurate scale diagrams.</p> <p>6. Sequences, inequalities, equations and proportion The nth term of arithmetic sequences. Non-linear sequences. Inequalities. Solving equations. Proportion.</p>



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Spring Term	<p>7. Ratio and proportion Direct proportion. Writing ratios. Using ratios. Ratios, proportion and fractions. Proportion and percentage.</p> <p>Career Links: Travel agent, Tax inspector, Investment banker, Solicitor, Mortgage broker.</p>	<p>7. Lines and angles Quadrilaterals. Alternate angles and proof. Angles in parallel lines. Exterior and interior angles. Solving geometric problems.</p> <p>Career Links: Research scientist, Engineer, Architect, Tradesperson.</p>	<p>7. Circles, Pythagoras and prisms 2D representations of 3D solids. Circumference of a circle. Area of a circle. Pythagoras' theorem. Prisms and cylinders. Errors and bounds.</p> <p>Career Links: Architect, Structural engineer, Tradesperson, Computer programmer.</p>
Summer Term	<p>8. Lines and angles Measuring and drawing angles. Lines, angles and triangles. Drawing triangles accurately. Calculating angles. Angles in Triangles. Quadrilaterals.</p> <p>9. Sequences and graphs Sequences. Pattern sequences. Coordinates and midpoints. Extending sequences. Straight-line graphs. Position-to-term rules.</p> <p>10. Transformations Congruency and enlargements. Symmetry. Reflection. Rotation. Translations and combined transformations.</p> <p>Career Links: Architect, Structural engineer, Tradesperson, Health analyst.</p>	<p>8. Calculating with fractions Ordering fractions. Adding, subtracting, multiplying, dividing fractions. Mixed numbers.</p> <p>9. Real-life graphs Conversion graphs. Distance-time graphs. Line graphs. Real-life graphs. Curved graphs.</p> <p>10. Percentages, decimals and fractions Understanding percentages. Percentages of amounts. Fractions and decimals. Equivalent proportions. Writing percentages. Percentage increases and decreases.</p> <p>Career Links: Computer programmer, Sports analyst, Accountant, investment banker.</p>	<p>8. Graphs Curved graphs. Equations of straight lines. Using $y = mx+c$. Simultaneous equations. Graphs of quadratic functions. Non-linear graphs.</p> <p>9. Probability Mutually exclusive events. Experimental and theoretical. Sample space diagrams. Two-way tables. Venn diagrams.</p> <p>10. Comparing shapes Exterior and interior angles. Solving geometric problems. Congruent and similar shapes. Ratios in triangles. The Tan, Sine and Cosine ratios. Using trigonometry to find angles.</p> <p>Career Links: Astronomy, Engineering, Stockbroker, Investment banker, financial analyst, bookmaker, Pilot.</p>



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Overview of KS4 Curriculum		
Exam Board: AQA		Subject: GCSE Maths
	Year 10	Year 11
Autumn Term	<p>1. Number Number problems. Estimating. HCF and LCM. Calculating with powers. Zero, negative and fractional indices. Standard form. Intro to surds.</p> <p>2. Algebra Algebraic indices. Expanding and factorising. Equations. Formulae. Linear sequences. Non-linear sequences. Further expanding and factorising.</p> <p>3. Interpreting and representing data Statistical diagrams 1. Time series. Scatter graphs. Line of best fit. Averages and range. Statistical diagrams 2.</p> <p>4. Fractions, ratio and percentages Fractions. Ratio and proportion. Percentages. Fractions, decimals and percentages.</p> <p>Career Links: Data Analyst, Sports Performance Analyst, Accounting and Finance.</p>	<p>12. Similarity and congruence Congruence. Geometric proof. Similarity in 2D and 3D shapes.</p> <p>13. Further trigonometry Accuracy. Graphs of the sine and cosine functions. The tangent function. Calculating areas and the sine rule. The cosine rule and bearings. 3D Pythagoras and trigonometry. Transformation of trigonometric graphs.</p> <p>14. Further Statistics Sampling. Cumulative frequency. Box plots. Drawing histograms. Interpreting histograms. Comparing and describing populations.</p> <p>Career Links: Data Analyst, Sports Performance Analyst, Architect, Engineer.</p>
Spring Term	<p>5. Angles and trigonometry Angle properties of triangles and quadrilaterals. Interior angles of a polygon. Exterior angles of a polygon. Pythagoras' theorem. Trigonometry.</p> <p>6. Graphs Linear graphs. Graphing rates of change. Real-life graphs. Line segments. Quadratic graphs. Cubic and reciprocal graphs. Interpreting graphs.</p> <p>7. Area and volume Perimeter and area. Units of accuracy. Prisms. Circles. Sectors. Cylinders and spheres. Pyramids and cones.</p> <p>8. Transformations and constructions 3D solids. Reflections and rotations. Enlargement. Translations and combined transformations. Bearings and scale drawings. Constructions. Loci.</p> <p>Career Links: Motor sports technician, Automotive engineer, Aerospace technician.</p>	<p>15. Equations and graphs Solving simultaneous equations graphically. Representing inequalities graphically. Graphs of quadratic functions. Solving quadratic equations graphically. Iteration. Graphs of cubic functions.</p> <p>16. Circle Theorems Radii and chords. Tangents. Angles in circles. Applying circle theorems.</p> <p>17. Further algebra Rearranging formulae. Simplifying algebraic fractions. Algebraic fraction calculations. Further surds. Functions. Proof.</p> <p>Career Links: Aerospace industry</p>



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Summer Term	<p>9. Equations and inequalities Solving quadratic equations. Completing the square. Simultaneous equations. Linear inequalities.</p> <p>10. Probability Combined events. Mutually exclusive events. Experimental probability. Independent events and tree diagrams. Conditional probability. Venn diagrams and set notation.</p> <p>11. Multiplicative reasoning Growth and decay. Compound measures. Ratio and proportion.</p> <p>Careers: Accounting and Finance, Economist, Bookmaker.</p>	<p>18. Vectors and geometric proof Vector notation. Vector arithmetic. Parallel and collinear points. Solving geometric problems.</p> <p>19. Proportion and graphs Direct proportion. Inverse proportion. Exponential functions. Non-linear graphs. Translating graphs of functions. Reflecting and stretching graphs of functions.</p> <p>Careers: Aerospace and Astronomy.</p>
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Overview of KS5 Curriculum				
Exam Board: Edexcel		Subject: A Level Maths		
	Year 12		Year 13	
	Teacher A	Teacher B	Teacher A	Teacher B
Autumn Term	Algebraic Expressions Equations and Inequalities Straight Line Graphs Probability Statistical Distributions Hypothesis Testing Career Links: Bookmaker, Stockbroker, Engineer, Analyst	Quadratics Graphs and Transformations Differentiation Integration Vectors Career Links: Astronaut, Engineer, Software developer, Video game developer.	Radians Trigonometric Functions Trigonometry and Modelling Parametric Equations Regression, Correlation and Career Links: Aeronautical engineer, Architect, Data Analyst, Pilot.	Differentiation Integration Forces and Friction Moments Career Links: Astronaut, Engineer, Software developer, Physicist.
Spring Term	Circles Algebraic Methods The Binomial Expansion Exponentials and Logarithms Career Links: Medicine, Archaeology, Software developer.	Modelling Mechanics Constant Acceleration Trigonometric Ratios Trig. Identities and Equations Career Links: Engineer, Mechanic, Architect.	Hypothesis Testing The Normal Distribution Conditional Probability Numerical Methods Vectors Career Links: Data analyst, Bookmaker, Performance analyst, Video game developer.	Projectiles Applications of Forces Further Kinematics Career Links: Robotics researcher, engineer.
Summer Term	Large data set Data Collection Measures of Location and Spread Representations of Data Correlation Binomial Expansion (Yr 2) Functions and Graphs (Yr 2) Career Links: Sports performance analyst, Meteorologist, Marketing.	Forces and Motion Variable Acceleration Algebraic Methods (Yr 2) Sequences and Series (Yr 2) Career Links: Engineer, Mechanic, Forecasting and data scientist.	Revision	Revision



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Overview of KS5 Curriculum					
Exam Board: Edexcel			Subject: Further Maths		
	Year 12			Year 13	
	Teacher A	Teacher B	Teacher C	Teacher A	Teacher B
Autumn Term	Matrices Linear Transformations Career Links: Computer programmer, Graphics artist.	Complex Numbers Momentum and Impulse Further Collisions Career Links: Engineer, Physicist.	Argand Diagrams Roots of Polynomials Discrete Random Variables Career Links: Signal processor, DNA scientists, Stock market trader.	Probability Generating Functions Hyperbolic Functions 6A-D Complex Numbers 1.5 - Career Links: Actuary, Risk manager, Architect.	Series Elastic strings and springs Differential Equations Career Links: Bungee jump mechanic.
Spring Term	Series Vectors Volumes of Revolution Career Links: Woodworker, Computer graphics artist	Proof Work Energy Power Hypothesis Testing Career Links: Meteorologist, Data analyst, Rock climber.	Poisson Distribution Geometric and Neg Binomial Distributions Chi Squared Career Links: Scientist, Data analyst, Research geneticist.	Central Limit Theorem Hyperbolic Functions 6E - Volumes of Revolution Polar Co-ordinates Quality of Tests Career Links: Pilot, Sailor, Woodworker, Architect.	Elastic Collisions in 2D Methods in Calculus Modelling with Differential Eq Career Links: Vehicle safety tester, Sports performance analyst, engineer.
Summer Term	Year 2 Differentiation Career Links: Engineer, Mathematician.	Year 2 Normal Distribution Year 2 FM Complex Numbers Career Links: Electrical engineer.	Year 2 Partial Fractions Year 2 FM Series Career Links: Physicist, Rocket scientist.	Revision	Revision



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Curriculum Rationale:

Our Maths curriculum is designed with the needs of our highly able students in mind. From Years 7 to 11 our 5-year curriculum is built on a spiral model, which looks to build on prior knowledge of topics as students progress through the school. Setting up the learning this way allows us regularly to assess students' prior knowledge before we extend them through the next phase of a particular topic. It also allows us to gradually build their knowledge and understanding over time, allowing them to grow in confidence but also in their levels of expertise.

At Years 7 to 9 all follow a 10 unit curriculum designed by Edexcel and resourced and adapted to suit the needs of our students. At GCSE we follow the Edexcel specification with content largely determined by the exam board. Edexcel was chosen as we feel it is well-resourced in terms of exam preparation materials as well as high quality textbooks. A Level Maths and Further Maths also follow the Edexcel specification with content largely determined by the exam board. Edexcel was chosen as we feel it is well-resourced in terms of exam preparation materials as well as high quality textbooks. We utilise the schemes of work produced by Edexcel in order to ensure the learning have a developmental and sequential arc. By designing and curriculum that spans the whole of KS3 and KS4 we have ensured a high level of cohesion for our students and their learning. Using the same exam board specification across KS3-5 we are confident students are gaining the knowledge and experience with topics to be successful.

We begin each unit with a 'diagnostic test' to ascertain an accurate starting point, identify misconceptions and find gaps in students understanding. Once the unit content has been taught, we then complete a 'Check Up' booklet (at KS3/4) or a 'Pre-Test' at KS5 to review the learning. This gives us an opportunity to review the learning and understanding that has happened during the lessons in a more summative form. At KS3 and 4, students then complete a 'Unit Assessment' in test conditions. At KS5, student will either complete a 'Chapter Assessment', a 'mini test' or be tested on the chapter content later. At KS3 and 4, students will then complete a 'review sheet' to identify any gaps in their knowledge as well as corrections using a video 'walkthrough' of the assessment. They will then go away and complete a series of 'fixes' via the DFM platform to address this. At KS5, teachers will go through the assessments as this face-to-face interaction is more effective when the content is more complex.

The approach to our Maths curriculum was adopted in September 2022. As such we are still relatively early in the embedding process for our new curriculum, however we feel that students are becoming more confident in topics with the introduction of the mechanisms of support (diagnostic tests, check ups, review sheets and fixes). The introduction of the Dr Frost Maths (DFM) platform has meant our students are now on track to answer over 1 million questions this academic year alone. This level of engagement is very encouraging and highlights the tenacity and determination our students have. This is an attitude we nurture in lessons.

We also have a DFM leader board that we update each half-term to keep our students motivated through some healthy competition.

The system of curriculum delivery we use provided multiple opportunities to assess and address gaps in learning and we are confident that we can address the impact of the pandemic in a 'real-time' fashion as we teach the curriculum.