Our Lady Queen of Peace

Catholic Engineering College

Curriculum Overview

Year 10 Mathematics (*Higher*)

	Knowledge & Understanding			Subject Specific Literacy Development		Cultural Capital / Enrichment Opportunities
	Composites (Bigger Picture)	**Components (Key Concepts)**	**Recall & Retrieval Focus**	**Read Like A... Focus**	**Key Vocabulary**	
Half Term 1	**Basic and Real-Life Graphs**	Draw and interpret straight-line graphs Draw distance–time and velocity–time graphs Use graphs to calculate various measures Find the coordinates of the midpoint of a line segment with a diagram given and coordinates Calculate the length of a line segment given the end points .	Key skills from Y9 HT6 Class specific based on Y9 AC3 QLA	Multi-step reasoning problems. Draw and interpret mathematical diagrams.	Midpoint Quadrant Line Segment	**Health and Nutrition Graphs** Compare average calorie intake or physical activity levels across countries or demographics using bar and line graphs. Reflects cultural and economic factors.
	Linear Graphs and Coordinate Geometry	Plot and draw graphs of y = a, x = a, y = x and y = –x Identify and interpret the gradient of a line segment Recognise that equations of the form y = mx + c correspond to straight-line graphs Identify & interpret the gradient and y-intercept of a linear graph Find the equation of a straight line from a graph in the form y = mx + c Plot, draw accurately & sketch graphs of straight lines Find the equation of the line : one point and a given gradient Identify and interpret gradient from an equation ax + by = c Find the equation of a straight line from a graph and plot/draw graphs in the form ax + by = c Generate equations of lines parallel and perpendicular to the given line Use the fact that when y = mx + c is the equation of a straight line, then the gradient of a line parallel to it will have a gradient of m and a line perpendicular to this line will have a gradient of $-\frac{1}{m}$			Parallel Gradient y-intercept Perpendicular	
	Quadratic, Cubic and Other Graphs	Recognise a linear, quadratic, cubic, reciprocal & circle graphs Generate points and plot graphs of quadratic functions Find approximate solutions of a quadratic equation from the graph of the corresponding quadratic function Draw graphs of simple cubic functions using tables of values Draw graphs of the reciprocal function Draw circles that are centred around the origin			Quadratic Linear Cubic	

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	Transformation	Perform and describe rotations Identify the equation of a line of symmetry Describe and perform reflections on a coordinate grid Perform and describe translations using column vectors Describe and transform 2D shapes using enlargements by a positive integer, positive fractional, and negative scale factor; Describe and transform 2D shapes using combined rotations, reflections, translations, or enlargements Describe the changes and invariance achieved by combinations of rotations, reflections and translations			Rotations Translations Enlargements	
Half Term 2	**3D Forms and Volume inc. Cylinders, Cones and Spheres**	Find the surface area of prisms Convert between metric volume measures and capacity Use volume to solve problems Find the volume and surface area of a cylinder Use the formula for surface area and volume of a pyramid Use the formulae for volume and surface area of spheres and cones Solve problems involving more complex shapes and solids, including segments of circles and frustums of cones Find the surface area and volumes of compound solids constructed from cubes, cuboids, cones, pyramids, spheres, hemispheres, cylinders Give answers to an appropriate degree of accuracy or in terms of π Form equations involving more complex shapes and solve these equations.		Multi-step reasoning problems. Draw and interpret mathematical diagrams.	Surface Area Frustums Prism	Compare different sports balls (rugby, football, tennis) and calculate the surface area of a spherical ball using real measurements.
	Similarity and Congruence	Understand and use SSS, SAS, ASA and RHS conditions to prove the congruence of triangles Understand similarity of triangles Prove that two shapes are similar by giving the scale factor Understand the effect of enlargement on angles, perimeter, area and volume of shapes and solids Identify the scale factor of an enlargement of a similar shape as the ratio of the lengths of two corresponding sides, using integer or fraction scale factors Write the lengths, areas and volumes of two shapes as ratios in their simplest form Find missing lengths, areas and volumes in similar 3D solids			Congruence Similarity Scale Factor	**Activity:** Identify symmetrical and congruent patterns in local or famous buildings.

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		Know the relationships between linear, area and volume scale factors of mathematically similar shapes and solids Solve problems involving frustums of cones where you have to find missing lengths first using similar triangles				
	Accuracy and Bounds	Calculate the upper and lowers bounds of numbers given to varying degrees of accuracy Calculate the upper and lower bounds of an expression involving the four operations Find the upper and lower bounds in real-life situations using measurements and perimeters, areas, and volumes of 2D and 3D shapes given to appropriate degrees of accuracy Use inequality notation to specify an error interval due to truncation or rounding.			Bound Error interval	Why might underestimating volume in a construction setting lead to material waste or structural risk?
Half Term 3	**Compound Measures and Multiplicative Reasoning**	Understand and use compound measures and convert between metric speed measures, density measures and pressure measures. Use kinematics formulae from the formulae sheet to calculate speed, acceleration, etc Express a multiplicative relationship between two quantities as a ratio or a fraction Solve proportion problems using the unitary method Work out which product offers best value and considers rates of pay Work out the multiplier for repeated proportional change as a single decimal number Solve problems involving compound interest and depreciation;	Key skills from HT1 & 2 Class specific based on QLA	Multi-step reasoning problems. Draw and interpret mathematical diagrams.	Best Value Multiplier Density Pressure	**Speed of Transport Around the World** Compare average speeds in rural vs urban areas across countries — e.g. tuk-tuks in Thailand vs subways in New York or Tokyo.
	Solving Quadratic Equations	Factorise quadratic expressions in the form $ax^2 + bx + c$ Solve quadratic equations by factorisation and completing the square Solve quadratic equations that need rearranging Set up and solve quadratic equations Solve quadratic equations by using the quadratic formula			Quadratic Factorisation	

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	Simultaneous Equations	Find the exact solutions of two simultaneous equations in two unknowns using elimination or substitution to solve simultaneous equations Solve exactly, by elimination of an unknown, two simultaneous equations in two unknowns including linear / quadratic and linear / x2 + y2 = r2; Set up and solve a pair of linear simultaneous equations in two variables, including to represent a situation Interpret the solution in the context of the problem			Unknowns Elimination	Given two phone contracts or meal deals, use simultaneous equations to work out which is better depending on usage.
Half Term 4	**Inequalities**	Show inequalities on number lines Write down whole number values that satisfy an inequality Solve simple linear inequalities in one variable Solve two linear inequalities in x, find the solution sets and compare them to see which value of x satisfies both Use the correct notation to show inclusive and exclusive inequalities	Key skills from HT2 & 3 Class specific based on QLA	Multi-step reasoning problems. Draw and interpret mathematical diagrams.	Inequalities Number line	Debate: "Should the minimum wage be higher?" Explore and represent income brackets using inequalities. Investigate or simulate the trajectory of a sports ball and model it using $y=ax^2+bx+c$
	Quadratics	Sketch a graph of a quadratic function, identifying roots, y-intercept and turning point Be able to identify from a graph if a quadratic equation has any real roots Find approximate solutions to quadratic equations using a graph Expand the product of more than two linear expressions Sketch a graph of a quadratic function and a linear function, identifying intersection points Solve simultaneous equations graphically Solve quadratic inequalities in one variable, by factorising and sketching the graph to find critical values Solve linear inequalities in two variables graphically Show the solution set of several inequalities in two variables on a graphs Use iteration with simple converging sequences			Turning point Intersection Iteration	

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	Graphs of Trigonometric Functions	Recognise, sketch and interpret graphs of the trigonometric functions, y = sin x, y = cos x and y = tan x for angles of any size Know the exact values of sin θ, cos θ and tan θ for θ = 0°, 30°, 45° , 60° and 90° Apply to the graph of y = f(x) the transformations y = f(x) + a, y = f(x + a), y = –f(x), y = f(–x) for sine, cosine and tan functions f(x)			Function Exact value	Sine and cosine graphs model waves — water waves, sound waves, light waves, and radio signals.
Half Term 5	**Further Trigonometry**	Know and apply Area = ½ ab sin C to calculate the area, sides or angles of any triangle Know the sine and cosine rules, and use to solve 2D problems (including involving bearings). Use the sine and cosine rules to solve 3D problems. Solve geometrical problems on coordinate axes. Use trigonometric relationships and Pythagoras' Theorem in right-angled triangles to solve problems in 3D configurations. Calculate the length of a diagonal of a cuboid. Find the angle between a line and a plane.	Key skills from HT3 & 4 Class specific based on QLA	Multi-step reasoning problems. Draw and interpret mathematica l diagrams.	Cosine Sine	Calculate the angles or lengths needed for a roof truss using cosine rule.
	Collecting Data	Specify the problem and plan; decide what data to collect and what analysis is needed, understand primary and secondary data sources, consider fairness Understand what is meant by a sample and a population Understand how different sample sizes may affect the reliability of conclusions drawn Identify possible sources of bias and plan to minimise it Write questions to eliminate bias, and understand how the timing and location of a survey can ensure a sample is representative			Primary Secondary Sample Bias Survey	
	Cumulative Frequency, Box Plots, Histograms	Know the appropriate uses of cumulative frequency diagrams Construct and interpret cumulative frequency tables and graphs Compare the mean and range of two distributions, or median and interquartile range Draw and interpret box plots to find median, quartiles, range and interquartile range and draw conclusions Know the appropriate uses of histograms Construct and interpret histograms from class intervals with unequal width			Cumulative Frequency Distribution Quartile	Use ONS data to compare median earnings in different UK regions

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		From histograms: complete a grouped frequency table; understand and define frequency density; Estimate the mean from a histogram Estimate the median from a histogram with unequal class widths or any other information from a histogram, such as the number of people in a given interval.				
Half Term 6	**Probability**	Estimate the 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 Know that the sum of the probabilities of all outcomes is 1 Work out probabilities from Venn diagrams to represent real-life situations and also 'abstract' sets of numbers/values Use union and intersection notation Understand conditional probabilities and decide if two events are independent Draw a probability tree diagram based on given information, and use this to find probability and expected number of outcome Calculate the probability of independent and dependent combined events Use a Venn diagram and a tree diagram to calculate conditional probability Compare experimental data and theoretical probabilities Compare relative frequencies from samples of different sizes	Key skills from HT4 & 5 Class specific based on QLA	Multi-step reasoning problems. Draw and interpret mathematica l diagrams.	Experimental Outcome Event Sample Space	**Probability in Sport** Use data from real events (e.g. World Cup, Wimbledon, Olympics) to explore outcomes, odds, and performance statistics. Example: What are the chances of scoring a penalty kick? Winning a tennis match? **Lottery and Gambling Simulation** Run a class simulation of lottery draws. Discuss **how unlikely big wins are** and why people still play.

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						Encourage **financial literacy and critical thinking.**

Key Assessments			
When	**What will be assessed?**	**Why is this being assessed?**	**How will results be stored & students receive feedback?**
HT1	Basic and Real Life Graphs Linear Graphs and Coordinate Geometry	To assess the students understanding of and their retention of the topics taught. This information will be used to inform the topics that make up the recall and retention starter activities.	Scores will be stored on SIMS and student feedback will be through individualised Fix IT Questions.
HT2	Quadratic and Cubic Graphs Transformations 3D Volumes inc. Cones and Spheres		
HT3	Similarity and Congruence Accuracy and Bounds Compound Measures Multiplicative Reasoning Solving Quadratic Equations		
HT4	Simultaneous Equations Inequalities		
HT5	Quadratics Further Trigonometry Trigonometric Graphs		
HT6	End of Year Assessment – will assess content from across the Scheme of Work delivered this academic year.		