KS5 Curriculum Map

Term	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	Core	**Core**	**Core** Intro to Applied	**Applied**	**Applied**	**Revision and Core**
Year 12	**Quadratics** Solving Quadratic Equations: by factorising, by formula with simple sketches of curves **Inequalities** Linear and quadratic including discriminant Problems **Simultaneous Equations** linear, graphical interpretation, intersection of two lines, leading onto one linear, one quadratic **Algebraic Fractions** Factorising and cancelling in algebraic fractions, adding and subtracting. **Algebraic Division** Algebraic division by factorising and cancelling in algebraic fractions and dividing a polynomial by a linear expression **Factor Theorem** Factor theorem application and use to fully factorise a cubic expression **Proof** Proof by deduction, exhaustion and disproof by a counter-example, following logical steps **Indices** laws of indices, evaluate expressions including negative, fractional and zero indices **Surds** manipulate surds, multiply and divide, rationalise the denominators, difference of two squares for rationalising	**Differentiation** Differentiation introduction - gradient at a point (tangent and limits), understanding why it works Standard method practice (including fractional and negative indices). Equations of tangents and normals Increasing and decreasing functions and stationary points Optimisation problems **Vectors** Introduction, column vectors, I and j form, magnitude of a vector, adding vectors, unit vectors, multiplying by scalars Working with vectors, position vectors, use vectors to solve geometric problems Modelling with vectors, use vectors in speed and distance calculations **Integration** Understand as the reverse of differentiation, understand the need for +c, integrate polynomials Simple expressions, given f'(x) and a point on the curve, find an equation of the form f(x**)** Evaluate a definite integral Finding area bounded by a curve and the x-axis Area bounded by curves and straight lines **Coordinate Geometry - lines** straight lines: gradients, equation of a straight line, parallel and perpendicular lines, midpoints, lengths of line segments Intersection of two lines	**Exponentials** e sketch, solve, differentiation, modelling **Modeling Velocity/Time Graphs** Distance time graphs and velocity time graphs **Kinematics** SUVAT: understand and derive SUVAT equations **Probability Distributions** Probability - mutually exclusive events, independent events, set notation, Tree diagrams and venn diagrams("and" "or" rules) Discrete probability distributions	**Kinematics 1** SUVAT: problem solving SUVAT: motion under gravity **Forces and Newton's Laws** Forces: types of force, drawing force diagrams, Newton's first law, forces as vectors in I and j form, mass and weight Newton's second law - basic concepts, introducing resultant force = mxa. Newton's second law - problem solving, including in terms of i and j Newton's third law - introduction, connected particles car and trailer Using Newton's second law - connected particles lifts **Probability Distributions** Binomial distribution - basic concepts, manual calculations, how to use calculator, link to Binomial expansion Binomial distribution - further calcs, use of tables **Hypothesis Testing** Intro to hypothesis testing using the Binomial distribution-null hypothesis, alternative hypothesis, significance level, p-value Hypothesis testing using probability of test statistic (p value) and comparing it to significance level, understanding critical regions and acceptance regions One and two tail tests **Sampling** Sampling Methods **Statistical Measures** Measures of location and variation 1 and 2:	**Forces and Newton's Laws** Newton's third law - connected particles pulleys Newton's third law - smooth pulleys **Kinematics** Kinematics variable acceleration (rates of change) - introduce displacement, velocity and acceleration as functions of time, use differentiation to model motion for a particle moving with variable acceleration understand gradients of graphs link to rates of change; find max and min velocities and understand how this links with a=0 introduce integration to model motion of a particle moving under a variable force Kinematics variable force (integration) - understand area under the graph leads to an integral, use initial conditions - use calculus to derive the constant accelerations formulae **Statistical Measures** Measures of location and variation 1 and 2: measures of central tendency: mean, median, mode including grouped data and using interpolation to find median also range, inter-quartile range and inter-percentile range including use of linear interpolation Measures of location and variation 3: variance and standard deviation Coding for mean and standard deviation	**Partial Fractions** Introduction - two and three linear terms Repeated linear term Improper algebraic fractions **Differentiation - standard functions** Chain Rule Product Rule Quotient Rule **Radians** Introduce radians, conversions, exact values and graphs Radian measures - arcs and sectors Solving trig equations in radians (including use of tan and Pythagorean identities) Solving trig equations in radians (including use of tan and Pythagorean identities) Small angle approximations **Reciprocal trig functions** Introduction to sec, cosec, cot, sketching graphs Solving equations using cot identity and Pythagorean identities Proving trigonometric identities involving sec, cosec and cot

	Logarithms introduce and use logan=x and ax=n. Introduce log laws solve equations in the form ax=b Solve equations in the form ax=b **Binomial Expansion** using Pascal's triangle and factorial notation Using formula including finding individual coefficients Using formula including finding estimates **Graphs and Transformations** Sketching: cubics, quartics, reciprocals Transformations of functions	Parallel and perpendicular lines, length and area Problem solving **Coordinate Geometry - circles equation of a circle** Intersections of straight lines and circles Problems involving tangents and chords Problems involving circles and triangles **Trigonometry** Sine and Cosine Rule Graphs and Transformations Solving equations Solving equations using the tan identity Solving equations using the Pythagorean identities		measures of central tendency: mean, median, mode including grouped data and using interpolation to find median also range, inter-quartile range and inter-percentile range including use of linear interpolation	**Presenting Data** Histograms and frequency polygons - using big data set for examples, include mean and standard deviation for a histogram Scatter graphs, correlation, and regression, independent and dependent variables. Interpolation and danger of extrapolation. Equation of line of best fit, and linear regression (note that students are not expected to calculate the PMCC or the equation of the Bivariate data using large data set - specific tasks Outliers and cleaning data: recognition and interpretation, choose appropriate data presentation techniques, clean the data - using the large data set.	

Academic Excellence

We provide a supportive and challenging environment to ensure our students achieve academic excellence.

Ambition

We have the highest expectations for academic excellence and personal development and work hard to achieve them.

KNUTSFORD ACADEMY

Term	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	Core	Core	Applied	Applied	Exam	
Year 13	**Differentiation** Recap of chain product quotient rule Implicit Differentiation Second Derivatives Rates of Change **Integration** Standard results f(ax+b) Reverse chain rule Substitution By parts Finding areas Trapezium Rule Separate the variables **Trig functions** Inverse Functions Use of Graphs Trig Addition Formulae Trig Double Angles Trig Proofs Differentiating Trig Functions Trig Modelling **Functions** Domain, range, composite, inverse, for simple functions Composite and inverse with e and ln Modulus functions	**Integration** Differential equations Modelling with differential equations **Vectors** 3D Co-ordinates and vectors in 3D **Mechanics** Solving geometric problems and Application to mechanics **Moments** Introduction to moments Moments and equilibrium Non-uniform rods Tilting **Sequences and series** Iterative/recurrence relations Arithmetic Geometric **Binomial Series** Use of the formula for negative and fractional values of n Additional bracket Approximations and binomial series from partial fractions **Parametrics** Convert to Cartesian Curve sketching Solving geometric problems Modelling and solving real life problems Differentiation	**Parametrics** Integration **Numerical Methods** Locating roots and iteration Newton Raphson **Proof by contradiction** **Resolving Forces** Inclined planes Friction **Projectiles** Projectiles at any angle Deriving formulae **Application of Forces** Equilibrium Weight, tension and pulleys Friction and static particles Static rigid bodies Dynamics and inclined planes Connected particles on inclined planes **Regression and Correlation** PMCC Hypothesis test - for zero correlation **Probability** Set notation, Conditional probability Venn Diagrams, Tree Diagrams and Formula **Normal distribution** Definition and Calculations The Inverse Normal	**Further Kinematics** Vector equations of motion Vector methods with projectiles Variable acceleration in one dimension Differentiating vectors **Normal distribution** The standard normal distribution (mean =0 and s.d. =1), standardise normally distributed random variables Finding the mean and standard deviation using standard normal Approximating a Binomial distribution Hypothesis testiNG		