	CAM Trust Mathematics Department	**This document outlines the main activities you will complete this year. Use this as a guide to prepare for lessons or check your understanding.** # F scheme Learning log 2023/24
Name:		
Maths teacher(s):		
Maths group:		

I will:

- work to the best of my ability, showing all my workings
- complete my homework to a good standard by the deadline set
- show tenacity when solving problems
- always have the correct equipment for all lessons

Signed:

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The Mathematics Department will:

- help you develop fluency in mathematical concepts
- help you develop your mathematical communication and reasoning
- help you develop problem solving skills
- set appropriate homework
- regularly assess your progress
- give you regular feedback and let you know what else you need to do to maintain or increase your progress

Signed:

Maths Department

Sparx Maths

Online homework tasks will be set at www.sparxmaths.com

You will use your school log-in details.

Use this space to keep track of your Sparx XP-level:

XP level	

Every lesson you will need to bring this equipment:

- exercise book
- learning log
- scientific calculator
- black pen × 2
- pencil × 2
- ruler
- eraser
- pencil sharpener
- highlighter

When advised, you will also need to bring:

- protractor
- pair of compasses

Optionally:

- colouring pencils

		Objectives Term 1 Autumn	Sparx
FNum1	A	Understand that the inverse of raising something to the power of n is raising it to the power of $\frac{1}{n}$	U985, U851
	B	Calculate fractional powers (positive and negative) of numbers, eg $4^{\frac{1}{2}} = \sqrt{4} = 2$; $8^{\frac{1}{3}} = \sqrt[3]{8} = 2$; $16^{\frac{3}{2}} = \left(16^{\frac{1}{2}}\right)^3 = 4^3 = 64$	U772
	C	Solve problems using all of the indices laws	U235
	D	Estimate powers and roots of any positive number	U299
	E	Simplify numerical calculations by manipulating surds, eg simplify $\sqrt{2} \times \sqrt{8}$ or $\sqrt{18}$	U338, U633, U872
	F	Rationalise a denominator, such as $\frac{1}{\sqrt{3}}$	U707, U281
	G	Be able to expand brackets with surds, eg $(1 + \sqrt{5})(3 - 2\sqrt{5})$	U499
		power, indices, laws of indices, square root, surd, surd form, denominator, numerator, rationalise the denominator, expand brackets, simplify	
FAlg1	A	Solve quadratic equations by factorising eg $6x^2 - 11x + 3 = 0$	U178, U858, U960, U228
	B	Solve quadratic equations by completing the square	U397, U589
	C	Deduce turning points by completing the square	U769
	D	Understand how the quadratic formula works, *memorise it* and use it to solve quadratic equations	U665
	E	Rearrange quadratic equations eg $\frac{1}{x} + \frac{1}{x+1} = 1$ so they can be solved	
	F	Simplify an algebraic fraction	U103, U437, U294
	G	Add, subtract, multiply and divide algebraic fractions	U685, U457, U824
	H	Solve equations involving algebraic fractions leading to quadratics, eg $\frac{2}{x+1} + \frac{1}{x+2} = 1$	
	I	Expanding three binomial expressions such as $(x + 1)(2x - 3)(4x - 1)$, expanding an expression which has been cubed such as $(2x - 1)^3$	U606
		factorise, quadratic expression, solve, quadratic equation, complete the square, quadratic formula, surd, algebraic fraction, simplify, numerator, denominator, common factor, cancel	
FGeom1	A	Explain, use and prove these circle theorems: the angle in a semicircle is 90°; the angle at the centre is twice the angle at the circumference; angles subtended from the same chord are equal; opposite angles in a cyclic quadrilateral add up to 180°; the alternate segment theorem; tangents and radii meet at 90°; two tangents from the same point are equal in length; the perpendicular from the centre of a circle to a chord bisects the chord	U459, U251, U130, U489, U808, U807
	B	Use Pythagoras and trigonometry in 3-D	U541, U170
	C	Use the exact values of the trigonometric ratios for angles 0°, 30°, 45°, 60° and 90°	U627
	D	Explain and use the sine rule and cosine rule in 2-D and 3-D	U952, U591
	E	Be able to solve problems (including those involving bearings) using the sine and cosine rules, and the area of a triangle formula, in 2D	U164
	F	Know how to find the area of a triangle using the formula $\frac{1}{2} ab \sin C$	U592
		circle, radius, circumference, diameter, centre, chord, segment, sector, tangent, arc, bisect, bisector, circle theorems, angle in a semicircle, angle at the centre, angle at the circumference, subtended, cyclic quadrilateral, alternate segment theorem, perpendicular, prove, plane9	
FData1	A	Plot and interpret a cumulative frequency curve.	U182, U642
	B	Find the median, lower quartile, upper quartile, range and interquartile range from raw data or data presented in a stem-and-leaf or cumulative frequency diagram	
	C	Draw and interpret box plots	U879, U507
	D	Use all the evidence from a cumulative frequency table, curve, median, quartiles, IQR and box and whisker diagram to reach a conclusion on a hypothesis.	
	E	Decide how to display data and compare populations	
		median, quartiles, inter-quartile range, measure of spread, measure of location, cumulative frequency, running total, upper bound, cumulative frequency curve, upper bound, gradient, frequency, comparison, extreme values, box plot, shape of data, stem and leaf, percentage difference, significance, conclusion	

		Objectives Term 2 Spring	**Sparx**
FNum2	A	Use upper and lower bounds in calculations involving adding subtracting, multiplying and dividing	U657
	B	Find the maximum and minimum possible values for a value that has been rounded, including values that are compound measures, eg speed, time, etc	U587
	C	Explain how to give a final answer to an appropriate degree of accuracy after analysing the upper and lower bounds of a calculation	
	D	Solve problems by applying systematic listing strategies including use of the product rule for counting.	U369
		upper bound, lower bound, bounds, accuracy, decimal places, significant figures, systematic, product, digit	
FAlg2	A	Plot, sketch and recognise graphs of quadratics, cubics, circles, reciprocals, exponentials and trigonometry functions	U980 U593 U229 U450 U567
	B	Solve linear simultaneous equations using substitution	U760 U757 U137
	C	Solve simultaneous equations with one straight line and one curve from a graph	U875
	D	Solve simultaneous equations with one straight line and one curve by substitution	
	E	Use iteration to solve an equation	U434 U168
		graph, sketch, function, linear, quadratic, cubic, reciprocal, exponential, power, exponent, trig, trigonometric, sin, cos, tan, centre, origin, circle, piecewise, curve, line of symmetry, maximum, minimum, periodic, period, approximate, table of values, simultaneous equations, substitution, factorise, graphical method, iterative, iteration, recursive, solution, interval	
FGeom2	A	Calculate the arc length and area of a sector of a circle and link this to the volume and surface area of a cone	U116
	B	Calculate the area of a segment of a circle	U221 U373
	C	Calculate the volume of 3D shapes, including frustums	U350 U484 U617 U543 U426
	D	Solve problems involving area and volume, linking to Pythagoras and trigonometry in 2D and 3D	U259 U464 U523 U893 U561 U170
	E	Explain the effect of enlargement on area, surface area and volume	U630 U110
	F	Solve problems on area and volume factors	
		volume, pyramid, cone, frustum, segment	
FData2	A	Explain frequency density	U983 U814
	B	Draw a histogram with unequal groups	
	C	Complete a frequency table from a histogram	
	D	Estimate the mean from a histogram	U569 U877
	E	Compare data in two histograms, looking at skew	
	F	Draw and interpret frequency polygons	U840
		grouped data, representative, class width, frequency, frequency density, area, proportional, histogram, mean, continuous data	

		Objectives Term 3 Summer	Sparx
FNum3		There is no further number content in the GCSE Mathematics qualification, however previous number work will need to be revised in preparation for the exam.	
FAlg3	A	Transform graphs. Given a graph $y = f(x)$, be able to sketch the graphs of $y = af(x); y = f(bx); y = f(x+c); y = f(x) + d$	U455
	B	State the coordinates of the image point (on a transformed curve) when given an object point (on the original curve)	
	C	Draw and interpret real-life graphs, including distance-time graphs, velocity-time graphs and graphs in financial contexts	U611
	D	Use the kinematics formulae supplied to solve problems, i.e. $v = u + at$, $v^2 = u^2 + 2as$, and $s = ut + at^2$, including in interpretation of distance/time (or displacement/time) and velocity/time graphs	U585 U144
	E	Calculate or estimate the areas under graphs (including quadratic and other non-linear graphs)	U882
	F	Work out the formula for the nth term of a sequence, which many contain linear or quadratic parts	U206
		conversion graph, ready-reckoner, fixed charge, standing charge, kinematics, $suvat$, velocity, acceleration, initial velocity, area, trapezium, trapezia, gradient, transformation, translation, stretch, reflect, reflection, axis, function, sequence, linear sequence, quadratic sequence, term, nth term, algebraic	
FRatio3	A	Set up and solve a problem with direct proportion	U640 U407
	B	Set up and solve a problem with inverse proportion	U364 U138
	C	Set up and solve a problem with squared direct and inverse proportion	U721, U357
	D	Interpret a graph to help decide on a rule that connects two variables using direct and inverse proportion	U238
	E	Use a tangent to solve problems with real-life graphs, such as the velocity at any given time on a distance-time graph or the acceleration at any given time on a velocity-time graph	U800
		proportion, proportional, coefficient, coefficient of proportionality, direct proportion, indirect proportion, tangent, gradient, rate of change, y-intercept, equation of a straight line, $y = mx + c$	
FGeom3	A	Revision: Be able to apply vector methods to provide simple geometric proofs	U781 U660 U560
	B	Revision: Carry out calculations with column vectors	U632
	C	Understand that a matrix is a rectangular array of numbers which can be used to store information	B293 D941
	D	Multiply a 2 by 2 matrix by a 2 by 1 or a 2 by 2 matrix. Multiply a 2 by 2 or 2 by 1 matrix by a scalar.	D383 B947
	E	Know and use the zero matrix and the 2 by 2 identity matrix (I). Understand that $AI = IA = A$	B879
	F	Use transformation matrices	B718
		matrix, matrices, row, column, order, element, scalar, square matrix, commutative, associative, zero matrix, identity matrix (**I**), image, unit square, transformation matrix, matrix product, combined, composite	
FData3	A	Calculate and interpret conditional probabilities through representation using expected frequencies with Venn diagrams	U476 U748
	B	Understand and use the notation $P(B\|A)$ to refer to the conditional probability of B happening given that A has already happened. We read $B\|A$ as 'B given A'.	U729
	C	Understand that if two events A and B are independent, know that $P(B\|A) = P(B)$.	U558
	D	Understand that for dependent events, the outcome of the first event affects the probability of the second. Use and rearrange the formula $P(A \cap B) = P(A) \times P(B\|A)$.	
		Venn diagram, tree diagram, conditional, independent/dependent, with replacement, without replacement, at least one, complement, expected frequency, expectation	