Mathematics Narrative

"Beauty is the first test; there is no permanent place in the world for ugly mathematics." G.H.Hardy)

We begin our journey with a rigorous course in algebraic fundamentals. First by recapping all notation, nomenclature and and rubric that we have attempted to garner in the previous two years, so that students can immediately begin on plotting straight line graphs as the first major topic in the year. This year we want our students to continue to consider the various ways in which we can have a relationship between two numbers or two sets of numbers, building upon the previous year's learning and going deeper, for example in the first topic of straight-line graphs, students considered how to draw the graph in year 8 and the relationship between the x and y co-ordinates represented on a cartesian plane, whereas this year we look at gradients, y-intercepts, parallel lines etc. More succinctly, we are looking at the relationship between relationships of numbers.

This theme of learning a process with unknowns in applications that appear to be outside of algebraic content focused lessons continues with percentages and Maths and Money. We recap previous percentage knowledge leading in to reverse percentages which has the solving of equations by working backwards built implicitly into its process to solve. Some teachers may choose to be explicit in the algebra inherent in the process. This leads logically to Maths and Money which is also heavily percentage based. We then move on to 'Deduction' which contains much of the geometry content that will be covered this year. We begin by learning the grammar of some new geometric concepts such as angles in parallel lines and continue with the theme of solving implicit equations within the context of algebra. For example, the remaining matching side of an isosceles triangle given the one different angle can be found by producing an equation in the form 2x+y=180 etc.

We want to ensure that the algebraic rigor and perspective permeates our curriculum so just as students have begun to become comfortable with the shape and area-based skills, we move back to forming and solving equations. An excellent segue through these topics is to consider missing number problems, for example the volume of a cuboid is 56cm³ and has a width of 7cm and a height of 2cm. Calculate the length. Although this may not seem algebraic, students will envisage a 'missing number' that needs to be found, allowing the algebra to be intrinsic in the question. In the run up to the Christmas break, we want out students to have the opportunities to revisit any topics that the teacher decides needs more time, or perhaps a deeper delve before performing a summative assessment to verify the progress of the students in the academic year so far.

After an assessment period including revision, feedback etc we move on to covering some more abstract Mathematical concepts such as transformations, congruency

and constructions, inviting students to attempt the more 'hands-on' skills and learning and adapting processes. We then move back to the concept of forming and solving certain equations by considering ratio and proportion, beginning by recapping basic ratio notation and skills and continuing through to inverse and direct proportion where once again the teacher may choose the make the algebra implicit or explicit depending on the ability of the class. We further this process with the consideration of probability and the forming and solving of equations inherent within the fact that all probabilities sum to 1. For example, the probability of flipping a biased coin and getting heads is 0.3. What is the probability of getting tails? This question implicitly forms the equation $x + 0.3 = 1$ and so on. The final few weeks of term are dedicated to the completion of a final assessment with associated revision skills and feedback loop to summatively assess the progress of all students as they complete key stage and prepare to begin their GCSE course in earnest.

Loci and Construction	Construct perpendicular bisectors Construct angle bisectors Loci around a point, from a line and around a shape	Sparx Maths Clip M253 M239 M196 M232
Number	Prime factors, highest common factor, lowest common multiple. Adding and subtracting fractions, multiplying and dividing fractions.	Sparx Maths Clip M823 M227 M698 M931 M197 M265
Percentages	Percentage of amounts, percentage increase and decrease, reverse percentages, repeated percentage change.	Sparx Maths Clip M264 M476 M437 M528 M533
Maths and Money	Compound interest, simple interest, unit pricing problems, tax calculations, money problem solving.	Sparx Maths Clip M901 M681 U533 U332 U610
Deduction	Angles in parallel lines, angles around a point, in a triangle, in a quadrilateral and on a straight line, vertically opposite angles.	Sparx Maths Clip M818 M679 M351 M606 M163
3D Shapes	Nets of 3D shapes, plans and elevations, surface area of 3D shapes, volume of 3D shapes	Sparx Maths Clip M518, M229, M765, M534
Algebra	Use, simplify and interpret algebraic notation. Substitute numbers into formulae, equations and expressions, including scientific formulae. Simplify and manipulate algebraic expressions by collecting like terms. Expand with single brackets.	Sparx Maths Clip: M813 M417 M327 M795 M237
Linear Equations	Use algebraic methods to solve linear equations in one variable. Use algebraic methods to solve linear equations in one variable.	Sparx Maths Clip M707 M634 M647
Inequalities	Understand and use the concept and vocabulary of inequalities (meaning and representation on a number line). Use algebraic methods to solve linear inequalities in one variable.	Sparx Maths Clip M384 M118 M732
Transformations	Rotations, reflections, translations and enlargements. Enlargements from a point.	Sparx Maths Clip M139 M290 M190 M178, M881
Pythagoras' Theorem	Squares and roots, using Pythagoras' theorem to find the hypotenuse and shorter sides, using Pythagoras' theorem in 3 dimensions	Sparx Maths Clip M135 M677 M480 M147
Ratio & Proportion	Direct and inverse proportion, best buy problems, conversion graphs	Sparx Maths Clip M472 M681 M665 M448
Drawing Straight line Graphs	Plotting straight-line graphs Finding the equations of straight-line graphs Interpreting the equation of straight-line graphs	Sparx Maths Clip M932 M544 M888
Drawing quadratic graphs	Plotting non-linear graphs Finding the equations of non-linear graphs	Sparx Maths Clip U989 U667