KS3 Long Term Curriculum Plan: Mathematics - Year 8

Curriculum Aim: The national curriculum for mathematics aims to ensure that all pupils: ● become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately. ● reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language ● can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.
Link to prior learning: See KS2 National Curriculum for Mathematics
Rationale of sequencing: In mathematics, students follow a spiral curriculum that allows them to study requisite skills before moving onto more complex concepts. Students will revisit topics in subsequent years and build on prior knowledge and connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. Decisions about progression should be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content in preparation for key stage 4. In the Autumn term, students start with recapping their key number skills which support the geometry and algebra topics that are studied later in the Autumn and Spring terms. There is a greater emphasis on the module on ratio and proportion as well as compound measures. Students also first study transformations in the Summer term which builds on their previous study of the properties of shapes and angles.

Term	Focus / Topic	Knowledge & Skills (from NC/Programmes of Study)	Assessment
Autumn 1	Module 17 - Four Operations Module 18 - Number Properties Module 19 - Fractions, Decimals & Percentages	Students should be able to: ● Use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation property ● Use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative ● use approximation through rounding to estimate answers and calculate possible resulting errors expressed using inequality notation $a<x≤b$ ● Use integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 and distinguish between exact representations of roots and their decimal approximations ● Interpret and compare numbers in standard form A x 10^n 1≤A<10, where n is a positive or negative integer or zero ● work interchangeably with terminating decimals and their corresponding fractions(such as 3.5 and 2/7 or 0.375 and 3/8) ● define percentage as 'number of parts per hundred', interpret percentages and percentage changes as a fraction or a decimal, interpret these multiplicatively, express one quantity as a percentage of another, compare two quantities using percentages, and work with percentages greater than 100% interpret fractions and percentages as operators ● solve problems involving percentage change, including: percentage increase, decrease and original value problems and simple interest in financial mathematics ● express one quantity as a fraction of another, where the fraction is less than 1 and greater than 1	Half-term assessment on all topics covered since the start of year 8.

		Students should be able to:	
Autumn 2	Module 20 - Properties of Angles Module 21 - Constructions Module 22 – Perimeter & Area	Students should be able to: ● derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms, trapezia ● calculate and solve problems involving: perimeters of 2-D shapes (including circles), areas of circles and composite shapes ● understand and use the relationship between parallel lines and alternate and corresponding angles ● derive and use the sum of angles in a triangle and use it to deduce the angle sum in any polygon, and to derive properties of regular polygons ● derive and use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/at a given point, bisecting a given angle); recognise and use the perpendicular distance from a point to a line as the shortest distance to the line	Year 8 assessment week
Spring 1	Module 23 - Algebraic Manipulation Module 24 - Solving Equations	Students should be able to: ● substitute numerical values into formulae and expressions, including scientific formulae ● understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors ● simplify and manipulate algebraic expressions to maintain equivalence by: collecting like terms, multiplying a single term over a bracket , taking out common factors , expanding products of two or more binomials ● understand and use standard mathematical formulae; rearrange formulae to change the subject	Half-term assessment on all topics covered since the start of year 8.
Spring 2	Module 25 – Sequences & Graphs Module 26 - Ratio & Proportion Module 27 - Speed	Students should be able to: ● generate terms of a sequence from either a term-to-term or a position-to-term rule ● recognise arithmetic sequences and find the nth term ● use algebraic methods to solve linear equations in one variable (including all forms that require rearrangement) ● divide a given quantity into two parts in a given part:part or part:whole ratio; express the division of a quantity into two parts as a ratio ● understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction ● solve problems involving direct and inverse proportion ● change freely between related standard units [for example time, length, area, volume/capacity, mass] ● use compound units such as speed, unit pricing and density to solve problems	Half-term assessment on all topics covered since the start of year 8.
Summer 1	Module 28 - Representing Data Module 29 - Averages & Range Module 30 - Probability	Students should be able to: ● describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers) ● construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data ● describe simple mathematical relationships between two variables (bivariate data) in observational and experimental contexts and illustrate using scatter graphs. ● understand that the probabilities of all possible outcomes sum to 1 ● enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams ● generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities.	Half-term assessment on all topics covered since the start of year 8.

Summer 2	Module 31 - Volume & Surface Area Module 32 - Transformations	Students should be able to: ● derive and apply formula to calculate and solve problems involving: perimeter and area of triangles, parallelograms, trapezia, volume of cuboids (including cubes) and other prisms (including cylinders) ● identify properties of, and describe the results of, translations, rotations and reflections applied to given figures ● use the properties of faces, surfaces, edges and vertices of cubes, cuboids, prisms, cylinders, pyramids, cones and spheres to solve problems in 3-D ● identify and construct congruent triangles, and construct similar shapes by enlargement, with and without coordinate grids	End of year assessment on all topics covered since the start of year 8.

Further Information

The exam board used for Mathematics is **Edexcel** - http://qualifications.pearson.com/en/qualifications/edexcel-gcses/mathematics2015.html

Sparx Maths - https://sparxmaths.com/ (All students have individual logins and passwords to support with classwork, homework and revision)

Equipment - All students must attend lessons with pens (including a green pen), pencil, long ruler, rubber, protractor, pair of compasses, scientific calculator, exercise book and home learning book.