Curriculum Area:	Mathematics KS3 learning plan

Intent

Curriculum Statement:

Our curriculum aims to develop confident mathematicians who reason mathematically, help to develop an appreciation of the beauty and power of mathematics and have a sense of enjoyment and curiosity about the subject. The curriculum will enable students to develop conceptual understanding and to become fluent in the fundamentals of mathematics. It will also empower students to make connections between different areas of mathematics and encourage them to recall and apply knowledge rapidly and accurately. Our curriculum enables students to reason mathematically by following a line of enquiry, conjecturing relationships and generalisations as well as developing an argument, justification or proof using mathematical language. The curriculum will allow students to 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.

Personal development

Mathematics can be enjoyed as a worthwhile activity for its own sake and as a powerful tool in a wide range of applications. Enjoyment stems from the creative and investigative aspects of mathematics, from developing mathematical ways of perceiving the world and recognising underlying structures and connections between mathematical ideas. Mathematics is a subject that empowers students to prove results. Students develop their problem-solving, decision-making and reasoning skills through working on a range of tasks. Mathematics enables students to understand the numerical data related to becoming and staying healthy. Monitoring nutritional intake, blood sugar levels and cardiovascular health are all examples where mathematics assists understanding and can lead to making healthy decisions. By becoming financially capable, young people are able to exert greater control over factors affecting their health such as housing and money management. Strategy games and logic puzzles are an important part of maintaining mental health. Understanding risk through the study of probability is a key aspect of staying safe and making balanced risk decisions. Students learn to understand the probability scale and use it as a way of communicating risk factors. They develop an understanding of how data leads to risk estimates. By understanding probability and risk factors young people are able to make informed choices about investments, loans and gambling. An understanding of mathematics, and confidence in using a variety of mathematical skills, are both key to young people's ability to play their part in modern society. The skills of reasoning with numbers, interpreting graphs and diagrams and communicating mathematical information are vital in enabling individuals to make sound economic decisions in their daily lives. Mathematics skills and habits of mind are highly prized by many employers and mathematics is a gatekeeper to many careers and professions. Having confidence and capability in mathematics allows students to develop their ability to contribute to arguments using logic, data and generalisations with increasing precision. This in turn allows students to take a greater part in a democratic society. Becoming skilled in mathematical reasoning means students learn to apply a range of mathematical tools in familiar and unfamiliar contexts

Year 7- Content		Assessments		CEIAG
		Topics	Assessment type	
	1 Place value	**1.1 Recognising place value and writing integers using place value** **1.2 Ordering integers (and inequality symbols)** **1.3 Rounding to the nearest 10, 100, 100… (*number line*)** **1.4 Multiplying by 10, 100, 1000…** 1.5 Divide by 10, 100,…. 1.6 Multiply by 0.1, 0.01,… 1.7 Divide by 0.1, 0.01,… 1.8 Write 10, 100, etc. as powers of 10	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously.	The ability to understand and manipulate number is necessary in all careers. A scientist will use powers when working will very small quantities e.g. weights of molecules, atoms etc. Astronomers will use powers to measure large distances
	2 Four operations	**2.1 Addition** **2.2 Subtraction** **2.3 Multiplication** **2.4 Powers and roots** **2.5 Division (including relationship with multiplication)** **2.6 Order of operations (BIDMAS)** 2.6 Distributive and commutative law 2.7 Order of operations (including powers and roots)	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covelred previously.	The ability to understand and manipulate number is necessary in all careers.
	3 Negative numbers	**3.1 Ordering on a number line *(zero pairs)*** **3.2 Adding negative numbers** **3.3 Subtracting negative numbers** 3.4 Multiplying and dividing negatives (ANDU it's easier to teach this) 3.5 Combining operations	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously	
	5 Algebraic techniques	**4.1 representing and writing expressions** **4.2 algebraic notation** **4.3 collecting like terms (two variables including x^2)** **4.4 multiplying terms (commutative law so $4\times3x$ is $3x\times4$)** **4.5 substitution** 4.6 expanding single brackets 4.7 expand and simplify 4.8 substituting into harder expressions and formulae	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously.	Financial officers will use formulae to work out pricing structures e.g. for car hire, gas/electricity pricing.

	5 Solving equations	**5.1 visual representation of solving equations and concept of equality** **5.2 one step equations add and subtract** **5.3 one step multiply and divide** **5.4 two step equations** 5.5 two step with brackets 5.6 x on both sides 5.7 $x^2 = 9$ type of question	On- On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously.	Financial officers will use formulae to work out pricing structures e.g. for car hire, gas/electricity pricing.
	6 Factors and multiples	**6.1 Multiples of a number** **6.2 Factors of a number and basic HCF** **6.3 Prime numbers** 6.4 Prime factor tree 6.5 HCF and LCM *(Venn diagram)* 6.6 Index notation, HCF and LCM problems 6.7 Enrichment: Think like a mathematician	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously.	Timetable schedulers (train/ bus) will use multiples when creating timetables
	7 Fractions	**7.1 Representing fractions (bar model)** **7.2 Equivalence and simplifying** **7.3 Convert between mixed and improper fractions** **7.4 Ordering fractions** **7.5 Fractions of amounts** **7.6 Expressing one fraction as a quantity of another** **7.7 Add and subtract fractions with the same denominator** **7.8 Add and subtract fractions with a different denominator** **7.9 Multiplying fractions (including mixed,** fractions of amounts by multiplication) 7.10 Dividing fractions 7.11 Reciprocals 7.11 Order of operations with fractions	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously.	Fractions are used in real life in many different ways, but they are most commonly used in the cooking, construction and science industries. Because fractions describe an object or substance that has been divided into different equal parts, fractions can be found almost anywhere
	8 Decimals	**8.1 interpret decimals (place value)** **8.2 ordering decimals** **8.3 rounding to the nearest integer** **8.4 rounding to decimal places** **8.5 addition and subtraction with decimals** 8.6 multiply decimals 8.7 divide decimals 8.8 convert between units and measure 8.9 identify recurring decimals (calculator?)	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously.	Decimals are used anywhere money is used

	9 Percentages	**9.6 percentages of amounts non-calc** 9.7 increasing and decreasing by a percentage 9.8 decimal multiplier 9.9 using a multiplier (non-calculator) 9.10 percentage change with a multiplier **9.1 meaning of percentage (including percentages greater than 100%)** **9.2 converting to fractions** **9.3 converting to decimals** **9.4 express a quantity as a percentage of another** **9.5 known percentages of amounts**	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously.	A sports analyst will use percentages to measure performance, compare athletes, track improvement. Someone working in the financial sector will use percentages to calculate investment performance, costs for borrowing and lending money. Business and retail workers will calculate percentage profit, calculate discounts on products
	10 Ratio	**10.1 using ratio notation (bar models too)** **10.2 ratio and fraction** **10.3 simplifying and equivalent ratios** **10.4 sharing an amount into a given ratio** 10.5 sharing when one amount is given 10.6 more than other	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously.	Chefs and others on the hospitality industry will use ratio when scaling recipes
	11 Angles, parallel lines and triangles	**11.1 Describe a point, a line, a line segment, a ray, a plane, parallel and perpendicular lines** **11.2 Identify different types of angles** **11.3 Recognise the properties of vertically opposite angles, angles on a straight line and angles at a point, right angles** **11.4 Find unknown marked angles in a diagram using the above properties** **11.5 Types of triangles** **11.6 Angles in a triangle** 11.7 Angles with algebra 11.8 Angles on parallel lines	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously.	Pilots will use angles when flying planes to ensure they remain on the correct course
	12 Area and perimeter	**12.1 Perimeter of quadrilaterals, triangles and compound shapes** **12.2 Area of squares, rectangles and parallelograms** **12.3 Area of a triangle** 12.4 Area of compound shapes (show a net for them to find the area of) 12.5 circumference of a circle 12.6 area of a circle 12.7 sectors	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously.	Designers/engineers need to know exact areas/volumes when designing buildings

	13 Volume and surface area	**13.1 faces, vertices, edges** **13.2 volume of cubes and cuboid** **13.3 nets of cubes and cuboid** 13.4 surface area cubes and cuboids 13.5 compound shapes with cubes and cuboids	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously.	Designers/engineers need to know exact areas/volumes when designing buildings
	14 Linear sequences and graphs	**14.1 generating terms in a sequence** **14.2 finding a term using nth term** **14.3 substitute into a table of values** **14.4 plotting and reading coordinates** 14.5 plot an equation of a line in y=mx+c 'see the slope'	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously.	Cryptographers need to recognise and summarise patterns
	15 Collecting, organising and displaying data	**15.1 Collect some real, in-school data** **15.2 types of data/data collection** **15.3 tally charts** **15.4 frequency tables** (including grouped frequency tables) **15.5 pictograms** **15.6 line charts** **15.7 bar charts** 15.8 multiple bars on a bar chart 15.9 pie charts	On-going in class **formative assessment** using FtG assessments **Summative end of year assessment** focusing on the skills learnt this term. It will also include knowledge covered previously.	Statisticians will use averages/graphs and probability to analyse results, see patterns in data and plan for the future using probabilities

Year 8- Content		Assessments		CEIAG
		Topics	Assessment type	
	1 Factors and multiples	1.1 Primes, Prime Factorisation and Index Notation 1.2 Highest Common Factor (HCF) 1.3 Lowest Common Multiple (LCM) 1.4 Square Roots, Cube Roots and Prime Factorisation	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously.	Timetable schedulers (train/ bus) will use multiples when creating timetables
	2 Approximation and estimation	2.1 Rounding Numbers to Decimal Places 2.2 Rounding Numbers to Significant Figures 2.3 Estimation	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously	Approximation arises naturally in scientific experiments. The predictions of a scientific theory can differ from actual measurements but an approximate measure is often useful
	3 Ratio, rates and speed	3.1 Integer Ratios 3.2 All kinds of ratios 3.3 Scale Plans and Maps 3.4 Rate 3.5 Speed	Revision and exam question practice focusing specific areas identifies. This will be informed by PPE/ mock exams, formative assessment and class work.	Chefs and others on the hospitality industry will use ratio when scaling recipes
	4 More percentages	4.1 Expressing a Percentage as a Fraction or a Decimal 4.2 Simple Percentage Problems 4.3 Reverse percentages 4.4 percentage increase and decrease	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously	A sports analyst will use percentages to measure performance, compare athletes, track improvement. Someone working in the financial sector will use percentages to calculate investment performance, costs for borrowing and lending money. Business and retail workers will calculate percentage profit, calculate discounts on products
	5 Algebraic expressions, formulae and proof	5.1 Use of letters in algebra 5.2 Evaluation of Algebraic Expressions and Formulae 5.3 Algebraic Expressions in the Real World 5.4 Simplification of Linear Expressions 5.5 Proof	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously	Financial officers will use formulae to work out pricing structures e.g. for car hire, gas/electricity pricing
	6 Equations and inequalities in one variable	6.1 Simple Linear Equations in One Variable 6.2 Equations Involving Brackets 6.3 Forming Linear Equations to Solve Problems 6.4 Simple Inequalities	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously	Financial officers will use formulae to work out pricing structures e.g. for car hire, gas/electricity pricing.
	7 Coordinates & Linear Functions	7.1 Cartesian Coordinate System 7.2 Idea of a Function 7.3 Linear Functions and their Graphs 7.4 Gradients of Linear Graphs	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously	Coordinates will be used by anybody using a map. As well as those involved in creating GPS systems

	8 Number Patterns	8.1 Number Patterns and Sequences 8.2 General Term	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously	Cryptographers will need to recognise and summarise patterns
	9 Angles in Quadrilaterals & Polygons	9.1 Quadrilaterals 9.2 Polygons	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously	Pilots will use angles when flying planes to ensure they remain on the correct course
	10 Perimeter & Area	10.1 Area of Parallelograms 10.2 Area of Trapezia 10.3 Perimeter and Area of Composite Plane	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously	Decorators will need to calculate them amount of paint required to paint a wall or a fence
	11 Volume & Surface Area	11.1 Views and Nets of Three-dimensional (3D) Shapes 11.2 Volume and Total Surface Area of Prisms 11.3 Volume and Total Surface Area of Cylinders 11.4 Volume and Surface Area of Composite Solids	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously	Designers/engineers need to know exact areas/volumes when designing buildings
	12 Statistical Graphs	12.1 Line Graphs 12.2 Pie Charts 12.3 Use and Misuse of Statistical Graphs 12.4 Scatter Graphs	On-going in class **formative assessment** using FtG assessments **Summative end of year assessment** focusing on the skills learnt this year. It will also include knowledge covered previously	Statisticians will use averages/graphs and probability to analyse results, see patterns in data and plan for the future using probabilities

Year 9- Content		Assessments		CEIAG
		Topics	Assessment type	
	1 Indices & Standard Form	1.1 Positive indices and laws of indices 1.2 Zero and negative indices 1.3 Standard form	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously.	Scientists use Standard Form to write very large or very small numbers
	2 Proportion	2.1 Direct proportion 2.2 Inverse proportion	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously.	Bakers might use proportion to scale recipes or staffing schedulers may use this to calculate staffing requirements
	3 Equations in Two Variables	3.1 changing the subject of a formula 3.2 Linear equations in two variables 3.3 Solving simultaneous equations simultaneously 3.4 Solving simultaneous equations by the substitution method 3.5 Solving simultaneous equations by the elimination method	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously.	In order to find the most useful websites and display them at the top search engines represents all pages on the internet in a gigantic matrix. The matrix knows about how the various websites are linked and you can use linear algebra probability and graph theory to find the most popular sites.
	4 Quadratic Expressions	4.1 Factorising 4.2 Quadratic expressions 4.3 Expansion of algebraic expressions	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously.	Businesses may use quadratic expressions to model the rise and fall of profits over time
	5 Non-linear graphs	5.1 Graphs for constant rates of change 5.2 Quadratic graphs 5.3 Exponential and reciprocal graphs	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It	Pathologists will use exponential graphs to monitor and predict the growth of micro-organisms

			will also include knowledge covered previously.	
	6 Construction and loci	6.1 Perpendicular bisectors, perpendicular lines and angle bisectors 6.2 Constructing triangles 6.3 Loci	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously.	Architects: Will use constructions to create accurate scale drawings as part of projects
	7 Pythagoras' Theorem	7.1 Pythagoras' Theorem 7.2 Applying Pythagoras' Theorem 7.3 Converse of Pythagoras' Theorem	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously.	Sailors might use Pythagoras/trigonometry to calculate distances between different places, bearings to travel on. Surveyors/architects will use calculate angles/length etc
	8 Congruence and similarity	8.1 Congruent triangles 8.2 Similarity	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously.	Engineering: Congruent triangles are used in construction when we need to reinforce structures so that they are strong and stable, and do not bend or buckle in strong winds or when under load
	8 Enlargement and scale drawings	8.3 Enlargement of a plane figure 8.4 Scale drawing	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously.	Architects: will require scale drawings prior to creating scale models of projects
	9 Trigonometry	9.1 Trigonometric ratios and acute angles 9.2 Trigonometry – unknown sides 9.3 Trigonometry – unknown angles 9.4 Applying trigonometry	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously.	Sailors might use Pythagoras/trigonometry to calculate distances between different places, bearings to travel on. Surveyors/architects will use calculate angles/length etc.
	10 Surface Area	10.1 Pyramids 10.2 Cones	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It will also include knowledge covered previously.	Decorator: will need to calculate them amount of paint required to paint a wall or a fence
	11 Data Analysis	11.1 Mean and range 11.2 Median 11.3 Mode	On-going in class **formative assessment** using FtG assessments **Summative end of term assessment** focusing on the skills learnt this term. It	Statisticians will use averages/graphs and probability to analyse results, see patterns in data and plan for the future using probabilities

			will also include knowledge covered previously.	
	12 Probability & Sets	12.1 Introducing probability 12.2 Single events 12.3 Combined events 12.4 Mutually exclusive events 12.5 Introducing sets 12.6 Sets and Venn diagrams	On-going in class **formative assessment** using FtG assessments **Summative end of year assessment** focusing on the skills learnt this year. It will also include knowledge covered previously. Specific areas for development identified. This will be informed by summative assessment, formative assessment and class work.	Statisticians will use averages/graphs and probability to analyse results, see patterns in data and plan for the future using probabilities