Curriculum Overview

Subject: Mathematics

Ambition

By the end of Year 11 a student of mathematics at Dixons Trinity will:

- Take a mastery approach to a broad range of fundamental and advanced mathematical concepts. Students will be proficient in key areas such as number, ratio and proportion, algebra, geometry, statistics, and probability. This rigorous and comprehensive experience of mathematics is sequenced logically, building on prior knowledge and promoting deeper understanding through connections across topics.
- Apply mathematical reasoning and problem-solving skills effectively. Students will confidently approach a variety of complex problems, making informed decisions and employing appropriate strategies. They will be able to articulate their reasoning using formal mathematical language and demonstrate fluency in procedures and calculations, preparing them for future learning and successful careers

Department Sentence

The mathematics' department ensured that every student became skilled citizens who can use logic and problem-solving to explore, analyse and understand the world around them.

Principles

- **Intelligent sequencing of powerful knowledge**
    - We carefully structure our maths curriculum based on research to ensure effective learning. Using a spiral model, we revisit important concepts over multiple years, which research shows helps students retain knowledge better. By connecting maths to real-world examples, like careers, we make learning relevant and engaging, preparing students for future challenges in academics and professions.
    - Our maths curriculum not only teaches essential skills but also enhances critical thinking and problem-solving abilities. Through clear instruction and specific vocabulary, students learn to express their ideas confidently and apply maths in different situations they will face in real life. This builds resilience and a deeper understanding of the world, equipping students with the everyday maths they need to tackle challenges and seize opportunities in their lives.
    - We integrate Careers Education, Information, Advice, and Guidance (CEIAG) into our maths lessons to help students explore career paths and are fortunate enough to have the school lead on Careers within the department. By highlighting how maths applies to various professions through real-world examples, students understand the relevance of their studies beyond the classroom. This approach supports their academic success and helps them develop clear goals for their future, aligning with our academy's mission to prepare students for academic and professional excellence.
    - In our maths curriculum, we include diverse perspectives and contributions from global cultures and backgrounds. This ensures students learn about the historical and cultural contexts of mathematics from different civilisations. By using inclusive references and celebrating contributions from mathematicians worldwide, we promote understanding and respect for diverse viewpoints in maths education.
    - Our maths curriculum includes reading to deepen students' understanding and improve literacy skills. Using worded questions and specific vocabulary, students learn to apply mathematical concepts in real-life contexts, enhancing their ability to communicate clearly and succeed academically.
    - At Dixons Trinity, our maths curriculum aims to develop students' strong understanding of maths concepts and their practical applications. By fostering analytical thinking and problem-solving skills, we prepare students for academic success and future challenges in their chosen paths.
- **Beyond the National Curriculum**
    - At Dixons Trinity Academy, our mathematics curriculum exceeds national curriculum expectations and exam board specifications by integrating comprehensive learning experiences that go beyond standard requirements. In Years 7 to 9, we enrich students' mathematical understanding with topics like the Babylonian origins of time-telling, Fibonacci sequences, and the historical context of mathematical concepts like the Golden Ratio. These additions not only deepen their cultural capital but also foster a genuine appreciation for the beauty and relevance of mathematics beyond basic skills. As students progress to Years 10 and 11, our curriculum aligns closely with exam board specifications while continuing to enrich learning with advanced topics such as the historical development of Pythagoras' Theorem and Trigonometry's origins. By integrating these elements, our curriculum ensures students not only excel academically but also develop a profound understanding of mathematics, preparing them for future academic pursuits and professional success.

Overview

All children are entitled to a curriculum and to the powerful knowledge which will open doors and maximise their life chances. Below is a high-level overview of the critical knowledge children will learn in this particular subject, at each key stage from Reception through to Year 11, in order to equip students with the cultural capital they need to succeed in life. The curriculum is planned vertically and horizontally giving thought to the optimum knowledge sequence for building secure schema.

		Knowledge, skills and understanding to be gained at each stage*		
		Cycle 1	**Cycle 2**	**Cycle 3**
Year 7	**Knowledge Introduced**	Number, 2D Shapes Algebra - simplifying formulae and substitution	Fractions and proportion Algebra - sequences, forming and solving equations	Algebra - expanding and factorising Number - percentages
	Knowledge Revisited	Number - written methods, place value operations and negative numbers	Fractions - mixed, improper and four operations Sequences from patterns	Algebra - simplifying expressions Finding simple percentages of amounts
Year 8	**Knowledge Introduced**	Ratio and proportion Area	Statistics Linear equations	3D Shapes Probability and frequency tables
	Knowledge Revisited	Writing ratios and percentages of amounts Area and perimeter	Averages (MMMR) Solving equations using the balancing method	Properties of 3D shapes Averages from lists
Year 9	**Knowledge Introduced**	Standard form, proportion and ratio Linear graphs	Sequences and quadratic graphs Transformations	2D Geometry - Pythagoras, Trigonometry, Constructions and Loci Statistics
	Knowledge Revisited	Place value, rounding to significant figures, ratio and proportion	Tables and graphs Translation, line and rotational symmetry	Rearranging formulae and substitution Statistical diagrams
Year 10	**Knowledge Introduced**	F: Number, linear functions and quadratic functions H: Triple brackets, surds, quadratic sequences, simultaneous and algebraic fractions	F: Percentages, ratio and proportion Solving linear equations, simultaneous and inequalities H: Algebraic fractions, vectors and 3D Pythagoras and trigonometry	F: 2D Pythagoras/Trigonometry Probability, set notation 3D Shapes H: Conditional probability and Histograms
	Knowledge Revisited	Number, solving equations, solving and factorising	Percentages, ratio of amounts, solving using the balancing method	Pythagoras and Trigonometry in 2D, Venn diagrams and volume of cuboids and prisms
Year 11	**Knowledge Introduced**	F: Error intervals, angles, compound measures, Statistics, vectors, inequalities, circles and trigonometry H: Limits of accuracy, surds, equation of a line, circle theorems, functions and iteration	F: Constructions, loci, number, ratio and proportion, algebra - expressions, equations, sequences H: Quadratic inequalities, quadratic simultaneous, vector proof, similarity and Trig	F: Linear graphs, circles, Pythagoras, trigonometry, transformations and statistics revision H: Algebraic proof, conditional probability, transformations of graphs
	Knowledge Revisited	Number - rounding, angle properties, statistics, circles and trigonometry	Ratio and proportion, solving equations and forming and solving simultaneous equations	Graphs, Pythagoras, Trigonometry and probability and statistics

A powerful, knowledge-rich curriculum teaches both substantive knowledge (facts; knowing that something is the case; what we think about) and non-declarative or procedural knowledge (skills and processes; knowing how to do something; what we think with). There are no skills without bodies of knowledge to underpin them. In some subjects, a further distinction can be made between substantive knowledge (the domain specific knowledge accrued e.g. knowledge of the past) and disciplinary knowledge (how the knowledge is accrued e.g. historical reasoning). Please refer to the DAT Curriculum Principles, published on the Trust website, for further information about how we have designed our curriculum around these concepts .

Homework

From Y7 onwards, our belief is that homework should be interleaved revision of powerful knowledge that has been modelled and taught in lessons. This knowledge is recalled and applied through a range of low-stakes quizzing and practice for every year group and is tied to Morning Meeting.

In addition, to support depth of learning and retrieval of powerful knowledge specifically in our subject domain we also:

- Provide all students with access to Sparx maths where they complete interleaved revision on previously taught content, this is tailored to optimally challenge and support each individual student.
- Issue weekly exam paper homework for Y11 students so they can become more familiar with the contexts used in exam questions and are revising a variety of topics. Support is provided at least once a week in lessons with live modelling, support and guided practice.