Meridian Trust

Curriculum Overview
MATHEMATICS

Curriculum Overview

Key Stage 3

Curriculum Aims

The aim of our shared curriculum is founded on the belief that ***all*** students can **learn, enjoy and succeed in mathematics.**
KS3 builds on existing schema by retrieving key KS2 knowledge. Significant time is spent developing deep understanding of the key ideas needed to underpin future learning.
Students develop conceptual and procedural understanding of a topic through fluency practice. All students are exposed to reasoning and problem solving to develop depth of understanding.

The journey through the curriculum and each topic is made clear to students. Links between topics are explicit and curriculum design allows students to practise key skills in multiple contexts.
Carefully chosen models are used across multiple topics.
Manipulatives are used to develop conceptual understanding where appropriate.

Key Curriculum Content

Year 7

- **Term 1**
  Properties of number, place value of integers and decimals, applications of place value with measure and Standard Index Form, significant figures and estimation.

- **Term 2**
  Properties of 2D shapes, four rules with integers and decimals, priority of operations.
- **Term 3**
  Introduction to algebraic notation and collecting like terms, linear sequences, expanding and factorising expressions, ordering and equivalence.

Year 8

- **Term 1**
  Solving linear equations, coordinates, fractions and simple probability.
- **Term 2**
  Forward percentages, perimeter and area, ratio.
- **Term 3**
  Basic angles, linear graphs, properties of 3D shapes.

How are students taught and assessed?

Pupils will sit a short, nationally benchmarked test at the start of year 7 (Progress in Maths – GL Assessments).

Teachers use shared resources to ensure students have a similar, positive experience of maths. Whole class teaching is dependent on prior knowledge of a topic. It aims develop deep understanding by exposing the mathematical structure of concepts and emphasising connections. This could consist of discussion, modelling and examples.

- Diagnostic questions are used at hinge points in lessons to expose misconceptions, gauge student understanding and allow re-teaching to happen if needed.
- Low stake, formative assessment is used at the end of a topic so gaps in student knowledge can be closed.
- Cumulative, summative assessments are used before each reporting point.

Typical Curriculum Allocation:
6-8 hours per fortnight

Curriculum Overview

Key Stage 4

Curriculum Aims

The aim of GCSE study in year 9 is to begin to build upon the key constructs of the year 7/8 mastery curriculum. The curriculum is designed to underpin both foundation and higher tier content. Decisions for the vast majority of the students around tiers of exam entry are usually made by the end of year 10.

Each topic is taught so that the key skills are mastered. Students develop fluency through reasoning and problem solving.

In year 11, greater focus is put upon exam technique and cross-topic fluency. Time is allowed for students to develop as independent learners and refine and improve their own mathematical ability.

Key Curriculum Content

- **Number: arithmetic**, working with fractions, decimals and percentages, surds, standard form, rounding, factors and multiples.
- **Algebra:** algebraic manipulation, equations, formulae, inequalities, functions, identities, graphing functions, sequences, real life graphs.
- **Ratio, Proportion & Rates of change:** growth and decay, compound measures, conversion graphs, best buys.
- **Geometry & Measure:** angles, trigonometry, Pythagoras' Theorem, similarity and congruence, area, perimeter, surface area and volume, transformations, loci and constructions, 2D/3D shapes.
- **Probability:** basic probability, independent/ mutually exclusive events, representing probabilities, relative frequency.
- **Statistics:** analysing and representing bivariate/ univariate data, averages.

"THROUGHOUT THE CURRICULUM STUDENTS DEVELOP A LIFELONG LOVE OF LEARNING AND THE NECESSARY SKILLS TO BE A RESILIENT, CONFIDENT AND INDEPENDENT LEARNER."

How are students taught and assessed?

Lessons are designed so that they address the objectives as outlined by the AQA specification. However, real world contexts and enrichment activities are completed to allow for enjoyment of the subject.

Students are prepared for cumulative assessments. Assessments are written using board specific exam level questions.

In year 10, the first two assessments are cumulative assessments based on previous learning and compiled using exam level questions. At the end of the year students will sit an official GCSE paper.

In year 11, students complete preparation examinations in November and March. In each of these windows students will sit official exam papers.

Typical Curriculum Allocation:
8 hours per fortnight

Curriculum Overview

Key Stage 5

Curriculum Aims

A Level - The aim of the maths and further maths curriculum is to extend on what has been taught before and develop a deeper understanding of mathematics. Developing new skills and interest in a very broad and challenging subject.

Core Maths - students will develop their quantitative and problem-solving skills. This gives them confidence in understanding the mathematical content in other courses they are taking. It helps them become better informed citizens, able to make sense of the information they will be presented with in employment, further study or later life.

Key Curriculum Content

A Level Maths

Pure – Mathematical argument, language and proof, Mathematical problem solving, Mathematical, Proof, Algebra and functions, Coordinate geometry in the (x,y) plane, Sequences and series, Trigonometry, Exponentials and logarithms, Differentiation, Integration, Numerical methods, Vectors

Mechanics – Quantities and units in mechanics, Kinematics, Forces and Newton's laws, Moments.

Statistics – Statistical sampling, Data presentation and interpretation, Probability, Statistical distributions, Statistical hypothesis testing

A Level Further Maths

Pure - Complex numbers, Proof, Matrices, Further Algebra and Functions, Further Calculus, Further Vectors, Polar coordinates, Hyperbolic functions, Differential equations, Trigonometry, Numerical Methods

Mechanics – Dimensional analysis, Momentum and collisions, Work energy and power, Circular motion, Centre of mass and moments.

Statistics – Discrete random variables and expectation, Poisson distribution, Continuous random variables, Chi squared tests for association, exponential distributions, Confidence intervals.

Discrete – Graphs, Networks, Network flows, Linear programming, Critical path analysis, Game theory for zero-sum games, Binary operations.

Core Maths

Analysis of data, maths for personal finance, estimation, critical analysis of data and models, normal distribution, probability and estimation, correlation and regression, critical path analysis, expectation, cost benefit analysis, graphical methods, rates of change, exponential functions

How are students taught and assessed?

A Level

Students are taught in line with either AQA or Edexcel specifications and where possible extended into real world uses. Topic assessments are written using past paper questions from each exam board. Cumulative assessments are also used to track progress and retrieval. Year 12 complete a baseline test in September. At the end of the year, year 12 will sit an AS paper. Year 13 sit a combination of questions for their mock exams based on content covered, using past exam questions.

A Level maths final assessments are three exams, each two hours. All papers are equally weighted towards the students final grade.

A Level Further maths final exam are 3 exams. All papers are equally weighted towards the students final grade.

Typical Curriculum Allocation:
A-Level, 8-10 hours per fortnight
Core Maths, 2-4 hours per fortnight

Core Maths

Students sit two exams. Paper 1 is 1.5 hours and uses Preliminary Material made available before the exam. Papers is 1.5 hours and is one of three pre-selected options, Preliminary Material is made available before the exam.

Curriculum Overview

Enrichment

Beyond the classroom

Pupils are entered into the UKMT individual and team challenges by each school as appropriate. In addition to this many schools run enrichment clubs and maths related after school activiites.

Real world applications of the subject are encouraged through the invitation of speakers from higher education and related professional fields.

Cross-Trust Activities

Inter-School Meridian Trust Team maths challenges for KS3 students. Students represent their school, competing against other schools within Meridian Trust. These events provide mathematically able students the opportunity to test their abilities against others.

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