

# Website Long Term Plans

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What is the purpose of Mathematics?	Department information
<p>The curriculum intent for Arthur Terry Mathematics is;</p> <p><b>At the Arthur Terry School we provide an inspiring and ambitious mathematics curriculum, rich in skills and knowledge, which prepares students for everyday life and future employment. We believe that everyone can achieve in mathematics and should have the same opportunities regardless of educational needs, background or ability. Our positive approach creates a love of learning and instils resilience lasting beyond the years spent in the classroom. Our pedagogy is underpinned by a mastery approach, utilising retrieval practice, key representations, problem solving and reasoning to embed a deep understanding of the subject. Our spiral curriculum is carefully sequenced and broken down into small steps to ensure that students are making meaningful connections across topics.</b></p>	<p>Core Leader: Kelly McCall</p> <p>KS3 coordinator: Bethany Briggs</p> <p>Assistant Core Leader inc. of KS4: Katherine Martin</p> <p>KS5 coordinator: Chester Garnish</p> <p>Core Maths Lead (year 12): Claire Wilson</p> <p>Exam board: AQA for GCSE and Core Maths, Edexcel for A-Level</p>
How do we develop Arthur Terry Learners?	
<p>In mathematics lessons we aim to promote resilience by providing a conjecturing atmosphere where students are encouraged to discuss ideas and reason mathematically. The mastery approach allows learners to develop their mathematical thinking using representation and allows opportunities for students to make connections with other</p>	

topics and other subjects. Metacognition is also developed through the opportunities we create for students to regularly upgrade their work and take ownership of their learning. Students are expected to be prepared for lessons and assessments and the use of Sparx maths and year group padlets support them in doing so, allowing them to take an active approach to their independent study.

	Topics/Units	Summary of key content
7	<ul style="list-style-type: none"> <li>Algebraic thinking</li> <li>Place value and proportion</li> <li>Applications of number</li> <li>Directed number</li> <li>Fractional thinking</li> <li>Lines and angles</li> <li>Reasoning with number</li> </ul>	<ul style="list-style-type: none"> <li>Sequences, Algebraic notation, Equality and equivalence</li> <li>Place value and ordering integers and decimals, Fraction, decimal and percentage equivalence</li> <li>Solving problems with addition, subtraction, multiplication and division, Fractions and percentages of amounts</li> <li>Operations and equations with directed number</li> <li>Addition and subtraction of fractions</li> <li>Constructing, measuring and using geometric notation, Developing geometric reasoning</li> <li>Developing number sense, Sets and probability, Prime numbers and proof</li> </ul>

		<p>Assessment takes place every lesson through the 'Do it now' activity. Short topic assessments will take place throughout the year at the end of each topic. There is a larger assessment at the end of each term.</p>
<p><b>8</b></p>	<ul style="list-style-type: none"> <li>• Proportional reasoning</li> <li>• Representations</li> <li>• Algebraic techniques</li> <li>• Developing number</li> <li>• Developing geometry</li> <li>• Reasoning with data</li> </ul>	<ul style="list-style-type: none"> <li>• Ratio and scale, Multiplicative change, Multiplying and dividing fractions</li> <li>• Working in the Cartesian plane, Representing data, Tables and probability</li> <li>• Brackets, equations and inequalities, Sequences, Indices</li> <li>• Fractions and percentages, Standard index form, Number sense</li> <li>• Angles in parallel lines and polygons, Area of trapezia and circles, line symmetry and reflection</li> <li>• The data handling cycle, Measures of location</li> </ul> <p>Assessment takes place every lesson through the 'Do it now' activity. Short topic assessments will take place throughout the year at the end of each topic. There is a larger assessment at the end of each term.</p>
<p><b>9</b></p>	<ul style="list-style-type: none"> <li>• Reasoning with algebra</li> <li>• Constructing in 2 and 3 dimensions</li> <li>• Reasoning with number</li> <li>• Reasoning with geometry</li> </ul>	<ul style="list-style-type: none"> <li>• Straight line graphs, Forming and solving equations, Testing conjectures</li> <li>• Three-dimensional shapes, Constructions and congruency, Numbers, Using percentages, Maths and money, Deduction</li> <li>• Rotation and translation, Pythagoras' theorem and trigonometric ratios, Enlargement and similarity</li> </ul>

	<ul style="list-style-type: none"> <li>Reasoning with proportion</li> <li>Representations</li> </ul>	<ul style="list-style-type: none"> <li>Ratio and proportion, Rates</li> <li>Probability, Algebraic representation</li> </ul> <p>Assessment takes place every lesson through the 'Do it now' activity. Short topic assessments will take place throughout the year at the end of each topic. There is a larger assessment at the end of each term.</p>
10	<ul style="list-style-type: none"> <li>Similarity</li> <li>Developing algebra</li> <li>Geometry</li> <li>Proportions and proportional change</li> <li>Delving into data</li> <li>Using number</li> </ul>	<ul style="list-style-type: none"> <li>Congruence, similarity and enlargement, Trigonometry</li> <li>Equations and inequalities, Representing solutions, Simultaneous equations</li> <li>Angles and bearings, Circles, Vectors</li> <li>Ratios and fractions, Percentages and interest, Probability</li> <li>Collecting, representing and interpreting data</li> <li>Non-calculator methods, Types of number and sequences, Indices and roots</li> </ul> <p>Assessment takes place every lesson through the 'Do it now' activity. Short topic assessments will take place throughout the year at the end of each topic. There is a larger assessment at the end of Autumn and Winter and a trial exam in the summer term.</p>
11	<ul style="list-style-type: none"> <li>Graphs</li> </ul>	<ul style="list-style-type: none"> <li>Gradients and lines, Non-linear graphs, Using graphs</li> </ul>

	<ul style="list-style-type: none"> <li>Algebra</li> <li>Reasoning</li> <li>Revision and communication</li> </ul>	<ul style="list-style-type: none"> <li>Expanding and factorising, Changing the subject, Functions</li> <li>Multiplicative reasoning, Geometric reasoning, Algebraic reasoning</li> <li>Transforming and constructing, Listing and describing, Show that...</li> </ul> <p>Assessment takes place every lesson through the 'Do it now' activity. Short topic assessments will take place throughout the year at the end of each topic. There will also be trial exams in the first two terms.</p>
<p><b>Core Maths 12</b></p>	<p>All students:</p> <ul style="list-style-type: none"> <li>Analysis of Data</li> <li>Maths for personal finance</li> <li>Estimation</li> <li>Critical Analysis of given data</li> </ul> <p>And either</p> <ul style="list-style-type: none"> <li>Normal distribution</li> <li>Probabilities and estimation</li> <li>Correlation and regression</li> </ul> <p>Or</p>	<p>All Students</p> <ul style="list-style-type: none"> <li>Data types, Collecting and sampling data, Representing data numerically, Representing data diagrammatically, Numerical calculations, Percentages, Interest rates, Repayments and cost of credit, Graphical representations, Taxation, Solution to financial problems, Fermi estimation, Presenting logical and reasoned arguments in context, Communicating mathematical approaches, Analysing data critically</li> </ul> <p>Statistical Techniques</p> <ul style="list-style-type: none"> <li>Properties of the normal distribution, Notation, Calculating probabilities, Population and sample estimations, The mean of sample size <math>n</math>, Confidence intervals, Correlation, Product moment correlation coefficient (pmcc), Regression lines, Calculations of pmcc and regression line</li> </ul>

	<ul style="list-style-type: none"> <li>• Critical path and risk analysis</li> <li>• Expectation</li> <li>• Cost benefit analysis</li> </ul>	<p>Critical Path and Risk Analysis</p> <ul style="list-style-type: none"> <li>• Compound projects, Critical activities, Gantt charts, Probability, Diagrammatic representations (tree diagrams/venn diagrams), Probability of combined events, Expected values, Control measures, Risk analysis</li> </ul> <p>Assessment takes place every lesson through the 'Do it now' activity.</p> <p>Progress assessments at the end of each section of work and trial exams when content is complete.</p>
<p><b>A-level</b> <b>12</b></p>	<ul style="list-style-type: none"> <li>• Pure Mathematics</li> <li>• Statistics</li> <li>• Mechanics</li> </ul>	<ul style="list-style-type: none"> <li>• Algebraic expressions, quadratics, equations and inequalities, graphs and transformations, straight line graphs, circles, algebraic methods, binomial expansion, trigonometric ratios, trigonometric identities and equations, vectors, differentiation, integration, exponentials and logarithms</li> <li>• Data collection, measures of location and spread, representations of data, correlation, probability, statistical distributions, and hypothesis testing</li> <li>• Modelling in mechanics, constant acceleration, forces and motion and variable acceleration</li> </ul> <p>Assessment takes place every lesson through the 'Do it now' activity.</p>

		<p>Base line assessment at the start of the year. Low stake assessments at the end of each chapter of learning. Larger assessment at the end of Autumn and Spring term, trial exam in summer term.</p>
<p><b>13</b></p>	<ul style="list-style-type: none"> <li>• Pure Mathematics</li> <li>• Statistics</li> <li>• Mechanics</li> </ul>	<ul style="list-style-type: none"> <li>• Algebraic methods, functions and graphs, sequences and series, binomial expansion, radians, trigonometry functions, trigonometry and modelling, parametric equations, differentiation, numerical methods, and integration</li> <li>• Regression and correlation, conditional probability, and normal distribution</li> <li>• Moments, forces and friction, projectiles, application of forces and further kinematics</li> </ul> <p>Assessment takes place every lesson through the 'Do it now' activity. Low stake assessments at the end of each chapter of learning. Trial exams and larger assessments in first two terms.</p>
<p><b>Further Maths</b> <b>12</b></p>	<ul style="list-style-type: none"> <li>• Core</li> <li>• Mechanics</li> <li>• Statistics</li> </ul>	<ul style="list-style-type: none"> <li>• Complex Numbers, Argand Diagrams, Series, Roots of Polynomials, Volumes of Revolution, Matrices, Linear Transformations, Proof by Induction, Vectors,</li> <li>• Momentum and Impulse, Work, Energy &amp; Power</li> <li>• Discrete random variables, Poisson distributions, Hypothesis testing, Chi-</li> </ul>

		squared tests
13	<ul style="list-style-type: none"> <li>• Core</li> <li>• Mechanics</li> <li>• Statistics</li> </ul>	<ul style="list-style-type: none"> <li>• Complex numbers, Series, Methods in calculus, Volumes of revolution, Polar coordinates, Hyperbolic Functions, Methods in differential equations, Modelling with differential equations</li> <li>• Elastic Strings and Springs, Elastic collisions in one dimension, Elastic collisions in two dimensions</li> <li>• Geometric and negative binomial distributions, Central Limit Theorem, Probability generating functions, Quality of tests</li> </ul>