Why should all students learn your subject?

Our vision is to cultivate resilient and creative problem solvers, where pupils see mathematics not as a set of rules to follow but a mindset when confronted with complex and challenging situations. We want our pupils to leave our school prepared to utilise the skills they develop in maths to solve seen and unseen problems and apply logical reasoning to make informed decisions.

We also believe that mathematical fluency is a core skill across our curriculum, and we share this belief with our pupils. We strive to create and celebrate opportunities for mathematics to be embedded in other areas of school life.

The powerful knowledge that our students gain through their maths lessons is essential for all our pupils. Every one of them must leave us with a confidence and fluency that sets them up to manage their own finances and everyday lives successfully. The problem solving, critical thinking and reasoning skills are also essential in a great number of careers, including many that are not immediately obvious.

The maths curriculum is divided into six strands.

Number: We want our pupils to be able to calculate and estimate accurately and fluently because we know that being able to do so supports their success in every other area of mathematics and in everyday life.

Ratio and proportion: Pupils need to understand the directly and inversely proportional relationships that they see in everyday life. A strong understanding of this strand will also support pupils studying economics, science, and a wide range of other subjects.

Algebra: Our goal is for pupils to understand algebra not as a collection of skills, but as a tool for solving problems and generalising. They should know that algebra allows us not just to show that something is sometimes true but that it is always true.

Geometry: An understanding of geometry is essential for every pupil. We all need to be able to estimate distance or capacity, convert between units of measure and carry out calculations to plan out practical projects. This also sets pupils up to be successful in a wide range of other subjects from art to physics.

Probability: We want pupils to understand the role probability plays in many careers, allowing us to make predictions and plan appropriately for all possible outcomes. We also want them to have a sense of the limitations of probability and our knowledge of what will happen next.

Statistics: It is important that our pupils can interpret and create a range of representations of data. They should be aware that some representations of data can be misleading and be able to choose representations that are appropriate for their data and their audience. We want pupils to be able to apply these skills across all of their subjects and use data effectively to support their arguments.

What is the core knowledge in your subject?
Throughout their time in primary at AJK, pupils are given extensive practice at the following, to secure fluent recall:
- **Number bonds**
- **Times tables**
- **Arithmetical procedures**

In addition, we aim through our teaching, task design and classroom culture to develop mathematical skills, including the following:
- **Exemplifying**
- **Completing**
- **Correcting**
- **Sorting**
- **Changing**
- **Reversing**

- **Generalising**
- **Specialising**
- **Explaining**
- **Verifying**

In secondary, the strands are broken down below:
- Number:
  - Structure and calculation
  - Fractions, decimals and percentages
  - Measures of accuracy
- Algebra
  - Notation, vocabulary and manipulation
  - Graphs
  - Solving equations and inequalities
  - Sequences
- Ratio and proportion
  - Ratio
  - Proportion
  - Rates of change
- Geometry and measure
  - Properties and constructions
  - Mensuration and calculation
  - Vectors
- Probability
  - Independent and dependent events
  - Randomness and fairness
  - Expected frequency
  - Sampling
- Statistics
  - Properties of populations and distributions
  - Inference
  - Interpret, analyse and compare

What is the key way students practice in your subject?
Due to the volume of content, students should repeatedly practise content throughout the curriculum, with extended exam style practise embedded in KS4.

To support pupils in developing links between topics, pupils will practise shared representations to link pictorial and abstract representations.

Maths Curriculum Content Overview		
Autumn	Spring	Summer
Y1 Numbers to 10 Addition and subtraction within 10 Shape and patterns Numbers to 20 Addition and subtraction within 20	Time Exploring calculation strategies within 20 Numbers to 50 Addition and subtraction within 20 Fractions Measures: Length and mass	Numbers Numbers 50 to 100 and beyond Addition and subtraction Money Multiplication and division Measures: Capacity and volume
Y2 Number within 100 Addition and subtraction of 2-digit numbers	Time Fractions Addition and subtraction of 2-digit numbers	Numbers within 1000 Measures: Capacity and volume Measures: Mass

	Addition and subtraction word problems Measures: Length Graphs Multiplication and division: 2, 5 and 10	Money Faces, shapes and patterns; lines and turns	Exploring calculation strategies Multiplication and division
Y3	Number sense and calculation strategies Place Value Graphs Addition and subtraction Length and perimeter	Multiplication and division Deriving multiplication and division facts Time Fractions	Angles and Shape Measures Securing multiplication and division Exploring calculation strategies and place value
Y4	Reasoning with 4-digit numbers Addition and subtraction Multiplication and division Interpreting and presenting data	Securing multiplication facts Fractions Time Decimals Area and perimeter	Solving measure and money problems Shape and symmetry Position and direction Reasoning with patterns and sequences Shape
Y5	Reasoning with large whole numbers Problem solving with integer addition and subtraction Line graphs and timetables Multiplication and division Perimeter and area	Fractions and decimals Angles Fractions, decimals and percentages Transformations	Solving measure and money problems Shape and Symmetry Position and Direction Reasoning with patterns and sequences Shape
Y6	Integers and decimals Multiplication and division Calculation problems Fractions Missing angles and lengths	Coordinates and shape Fractions Decimals and measures Percentages and statistics Proportion problems	Transition work
Year 7	Number and place value Multiplicative reasoning	Geometry Fractions	Applications of algebra Percentages and statistics
Year 8	Number and primes Algebraic expressions	Geometry Proportional reasoning	3D geometry Statistics
Year 9	Graphs and proportion Algebraic expressions	Construction and loci Equations and inequalities	Right angled triangles Statistics
Year 10 F	Geometric change Geometry	Reasoning Shape and space	Probability Fundamentals of algebra
Year 10 H	Geometric change Problem solving in 2D and 3D	Reasoning 3D shape and space	Probability Further algebra
Year 11 F	Circles and ratio Representing and manipulating data	Revision Revision	Revision N/A
Year 11 H	Circle theorems Representing and manipulating data	Functions and transformation Revision	Revision N/A
Year 12 Pure	Algebraic expressions Quadratics Equations and Inequalities Graphs and Transformations Binomial Expansion Straight line graphs Circles	Trigonometric identities and equations Differentiation Integration Vectors Exponentials and logarithms	*Year 2 content begins* Algebraic methods Radians Trigonometric functions

Commented [KM1]: I know you have sent a KS5 overview in excel, can we include a simplified version of that in this overview so that we give the whole picture?

	Trigonometric ratios					
Year 12 Applied	Measures of location and spread Intro to mathematical modelling Graphical representations of velocity, acceleration and displacement	Constant acceleration formulae Probability Statistical distributions	Data collection Hypothesis testing	Forces and motion Variable acceleration Representations of data Correlation	*Year 2 content begins* Normal distribution	Friction
Year 12 Further	Complex numbers Matrices Linear transformations Series Algorithms	Graphs and networks Roots of polynomials Allocation problems Proof by induction Algorithms on graphs Route inspection	Flows in networks Vectors Critical path analysis Game theory Linear programming	Argand diagrams Volumes of revolution Complex numbers pt. 2 Recurrence relations	Graphs and networks	Travelling salesman problems
Year 13 Pure	Trigonometry and modelling Differentiation 2 Integration 2	Algebraic methods Functions and graphs	Sequences and series Binomial expansion Trigonometry and modelling 2	Parametric equations Numerical methods	Revision	N/A
Year 13 Applied	Projectiles Further Kinematic	Normal distribution Conditional probability	Moments Regression, correlation and hypothesis testing	Applications of forces Vectors (from Pure)	Revision	N/A
Year 13 Further	Flows in networks 2 Route inspection Hyperbolic functions Allocation Dynamic programming	Polar coordinates Game theory 2 Critical path analysis 2 Recurrence relations 2	Polar coordinates Series Methods in calculus	Hyperbolic functions Volumes of revolution 2 Methods in differential equations Modelling with differential equations	Revision	N/A

	Simplex algorithm					
	Decision analysis					

In addition to content, students must master key skills. These include:

- Accurate recall facts, terminology and definition
- Use and interpret mathematical notation
- Deduce, infer and draw conclusions from mathematical information
- Construct chains of reasoning to achieve a given result
- Interpret and communicate information accurately
- Present arguments and proofs, and assess the validity of an argument through critical evaluation
- Transpose problems in non-mathematical contexts into a series of mathematical processes
- Make and use connections between different parts of mathematics
- Interpret results in the context of a given problem
- Evaluate methods used and results obtained, and identify how solutions may have been affected by assumptions