

## Why should all students learn your subject? (If relevant, why at AJK?)

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?

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?**

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

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	
Year 7	Number and place value	Negative numbers and algebra	Geometry	Coordinates and geometry	Fractions	Percentages and ratio
Year 8	Revision of Year 7 content (catch up due to Covid)	Algebra and sequences	Linear graphs, accuracy and estimation	Ratio and proportion	Circle geometry, statistics	Geometry – angles, volume, bearings
Year 9	Revision of Year 8 content (catch up due to Covid)	Probability	Algebra and solving graphically	Geometry, indices and standard form	Pythagoras, ratio, introduction to surds	Quadratic expressions and equations
Year 10 F	Number	Algebra	Proportional reasoning	Geometry – angles, Pythagoras, circles	Inequalities, compound measures	statistics
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	Revision	Revision	Revision	N/A

		manipulating data				
Year 11 H	Review of algebra, 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 ratios	Trigonometric identities and equations  Differentiation  Integration	Vectors  Exponentials and logarithms	<i>Year 2 content begins</i>  Algebraic methods  Radians	Trigonometric functions
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	<i>Year 2 content begins</i>  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  Simplex algorithm  Decision analysis	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