

Key Stage 3 Year 9 Curriculum Overview - Maths

Curriculum Intent

The Mathematics department strives to give students the confidence to acquire and use mathematical skills that will stand them in good stead throughout their lifetime. The department seeks to achieve excellence in the teaching and learning of Mathematics, in order for the students to make significant progress, irrespective of their prior attachment in this interesting and varied subject. As a core subject studied by all students throughout their time at school, we believe Maths is one of the most important and interesting in the curriculum. Wherever you look in the world there is Maths and we aim to equip students with the knowledge, and more importantly, the skills to fully participate in our information driven society.

Approach / Philosophy / Implementation:

The curriculum in Maths aims to ensure that students:

Develop a culture of deep understanding, confidence and competence in Maths producing strong, secure learning and progress.

Develop fluency in the fundamental skills of Maths through practice in different contexts and in problem solving.

Reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language.

Solve problems by applying mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Autumn term 1

Properties of number

- **Step 1** Factors, multiples and primes
- **Step 2** Write a number as a product of prime factors
- **Step 3** Use prime factors (E)
- **Step 4** Highest common factor (HCF) and lowest common multiple (LCM)
- **Step 5** Venn diagrams
- **Step 6** Use a Venn diagram to calculate the HCF and LCM
- **Step 7** Integers, real numbers and rational numbers
- **Step 8** Introduction to surds (E)
- End of block assessment (version B)

Percentages

- **Step 1** Percentage increase and decrease
- **Step 2** Express a change as a percentage
- **Step 3** Find the original value after a percentage change
- **Step 4** Solve problems with percentages (non-calculator)
- **Step 5** Solve problems with percentages (calculator)
- **Step 6** Repeated percentage change
- **Step 7** Understand interest

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	• Step 8 Simple interest • Step 9 Compound interest Area and volume • Step 1 Nets • Step 2 Area of a 2-D shape • Step 3 Area and circumference of a circle • Step 4 Surface area of cubes and cuboids • Step 5 Surface area of a triangular prism (E) • Step 6 Surface area of a cylinder (E) • Step 7 Volume of a prism • Step 8 Volume of a cylinder • Step 9 Volume of cones, pyramids and spheres (E) • Step 10 Convert metric units of area and volume (E)
Autumn term 2	Equations, inequalities and formulae • Step 1 Solve equations and inequalities • Step 2 Solve equations and inequalities with brackets • Step 3 Inequalities with negative numbers (E) • Step 4 Solve equations and inequalities with unknowns on both sides • Step 5 Solve problems with equations and inequalities • Step 6 Substitute into formulae and equations • Step 7 Change the subject of a formula (one-step) • Step 8 Change the subject of a formula (two-step) • Step 9 Change the subject of complex formula (E) Fractions • Step 1 Add and subtract fractions • Step 2 Multiply and divide fractions • Step 3 Fraction of an amount Rates • Step 1 Speed, distance and time • Step 2 Distance-time graphs • Step 3 Solve flow problems and their graphs • Step 4 Rates of change and their units • Step 5 Convert compound units (E) Standard form

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	• Step 1 Numbers in standard form • Step 2 Compare and order numbers in standard form • Step 3 Multiply and divide numbers in standard form • Step 4 Add and subtract numbers in standard form
Spring term 1	Maths and money • Step 1 Understand a bank account • Step 2 Spending • Step 3 Ways to pay • Step 4 Ways to save • Step 5 Jobs and pay • Step 6 Investing • Step 7 Borrowing (buying a house) • Step 8 Running a house or a business • Step 9 Budgeting • Step 10 Borrowing (loans) • Step 11 Spending overseas • Step 12 Insurance Straight line graphs • Step 1 Lines, parallel to the axes, $y=x$ and $y=-x$ • Step 2 Explore gradients • Step 3 Explore intercepts • Step 4 $y=mx+c$ • Step 5 Rearrange equations to the form $y=mx+c$ (E) • Step 6 Find the equation of a line from a graph • Step 7 Interpret gradient and intercepts of real-life graphs • Step 8 Graph inequalities (E) Ratio and proportion • Step 1 Direct proportion • Step 2 Direct proportion and conversion graphs • Step 3 Inverse proportion • Step 4 Inverse proportion graphs (E) • Step 5 Ratio problems (whole or part given) • Step 6 Solve problems with ratio and algebra (E)

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Spring term 2	Constructions and congruence • Step 1 Draw and measure angles • Step 2 Construct and interpret scale drawings • Step 3 Construct triangles using ASA, SAS and SSS • Step 4 Construct an angle bisector • Step 5 Construct a perpendicular bisector • Step 6 Construct a perpendicular from or to a point • Step 7 Construct more complex polygons • Step 8 Identify congruent figures • Step 9 Congruent triangles Similarity • Step 1 Recognise enlargement and similarity • Step 2 Work out unknown lengths and angles in similar shapes • Step 3 Solve problems with similar triangles (E) • Step 4 Ratio in right-angled triangles (E) Algebraic manipulation • Step 1 Expand single brackets and simplify • Step 2 Factorise into a single bracket • Step 3 Expand double brackets • Step 4 Use identities • Step 5 Factorise quadratic expressions (E) • Step 6 Solve quadratic equations (E) • Step 7 Expand triple brackets (E)
Summer term 1	Pythagoras' theorem • Step 1 Solve equations with squares and square roots • Step 2 Identify the hypotenuse • Step 3 Determine whether a triangle is right-angled • Step 4 Pythagoras theorem (find the hypotenuse)' • Step 5 Pythagoras theorem (find any side)' • Step 6 Use Pythagoras theorem on coordinate axes' • Step 7 Proofs of Pythagoras theorem (E)' • Step 8 Pythagoras theorem in 3-D shapes (E)' Non-linear graphs • Step 1 Substitute into quadratic expressions

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	• Step 2 Draw simple quadratic graphs • Step 3 Draw more complex quadratic graphs • Step 4 Interpret quadratic graphs • Step 5 Interpret reciprocal and exponential graphs • Step 6 Draw cubic graphs (E) • Step 7 Interpret cubic graphs (E) • Step 8 Interpret roots, intercepts and turning points (E) Probability • Step 1 Identify and represent sets • Step 2 Intersection of a set • Step 3 Union of a set • Step 4 Complement of a set (E) • Step 5 Probability of a single event • Step 6 Use diagrams to work out probabilities • Step 7 Relative frequency • Step 8 Expected outcomes • Step 9 Independent events • Step 10 Probabilities from Venn diagrams
Summer term 2	Transformations • Step 1 Enlargement (positive scale factor) • Step 2 Enlargement from a point (positive scale factor) • Step 3 Enlargement (fractional scale factor) • Step 4 Enlargement (negative scale factor) (E) • Step 5 Describe an enlargement • Step 6 Rotation about a point • Step 7 Describe a rotation • Step 8 Translation • Step 9 Describe a translation • Step 10 Reflection Simultaneous equations (optional block) • Step 1 Use one value to find another • Step 2 Introduction to simultaneous equations • Step 3 Solve simultaneous equations using graphs • Step 4 Solve simultaneous equations (no adjustments)

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	• Step 5 Manipulating equations • Step 6 Solve simultaneous equations (adjust one) • Step 7 Solve simultaneous equations (adjust both) (E) • Step 8 Solve simultaneous equations by substitution (E) Trigonometry (optional block) • Step 1 Identify hypotenuse, opposite and adjacent sides • Step 2 Use the tangent ratio to find unknown side lengths • Step 3 Use sine and cosine ratios to find unknown side lengths • Step 4 Use sine, cosine and tangent ratios to find unknown angles • Step 5 Choose the right method • Step 6 Key angles in right-angled triangles (E) • Step 7 Trigonometry in 3-D shapes (E)
Evidence of learning	Pupils complete 20-minute end of block assessments that cover each of the small steps after each unit of work. These are recorded and compared as a cohort to ensure good progress is being made. Assessment will be ongoing through lessons the use of mini-whiteboards and 'live' marking. Pupils will also have end of term tests to showcase retention of knowledge – this will help inform their grades and targets.
Links to prior learning	Links back directly to Y8 work completed at Holywell and all of our units of work build upon prior knowledge gained throughout KS2. Throughout the year skills learnt at Holywell will be revisited in different contexts (algebra with BIDMAS). Our scheme builds over time and allows for small steps to be taught by teachers so pupils can be the best they can be. If there are gaps we will endeavour to close these and adjust lessons accordingly.
Links to future learning	These skills are built upon in KS3 and are used regularly to solve problems. Start of GCSE curriculum – base works for this, especially algebra units.
Reading in the curriculum (Literacy & Vocabulary) Key vocabulary is identified in each unit and taught explicitly during lessons. We encourage pupils to talk like a Mathematician using the key words in Mathematics. Verbal discussion and Oracy in Maths are encouraged throughout learning. Pupils are encouraged to use full sentences in their explanations and reading strategies are reinforced when teaching.	
Careers in the curriculum Computer analyst Criminology expert Civil engineering – structure using shapes Programming Financial analyst Product designing/industry Software engineering Data analyst Computer Software developer System analyst Mathematical modeller Space scientist Accountant Growth analyst Pilot Construction Midwifery/Nursing Architecture Design/Industry Banking Teacher EVERY JOB!!	

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Protected Characteristics in the curriculum By maintaining high standards of behaviour, including mutual respect and tolerance for different faiths and beliefs and encouraging learners to respect the protected characteristics, class teachers will be promoting British values.
Safeguarding including safety in the curriculum Ensuring students are seated in a way that takes account of safeguarding notes and which promotes positive learning and social outcomes. Reporting any concerns within department and school policies.
Values across the curriculum Respect – Respecting different abilities in the classroom, different styles and approaches Perseverance & Resilience – Keeping on going is key to solving problems and improving within Maths Trust – Trusting the process – keep going and you will improve Community/Co-operation – working together to solve problems, fins mistakes and improve Joy/Happiness - To enjoy the subject of Maths Determination - To keep going
Spirituality in the curriculum Links to real-world scenarios – farming, transporting goods etc. Discussions on how we can use Maths to improve the world.
How we track your progress Linking to the progress descriptors all students’ progress is tracked through the work they produce and contribute to in class, homework, end of unit assessments and in class assessments/quizzes. Pupils access end of block tests when a unit of work is complete – this allows everyone to see where progress has been made. These are out of 20 each time and the papers go home so parents can see them. All learners also have end of term tests – these cover all skills in Maths and help to decide progress points – this is shared with learners. Homework on Sparx Maths also shows pupils their progress and rewards consistency/effort.
Parents/Carers can support their child by: Being positive with pupils. Checking test papers that come home and discussing Maths with pupils. Ensuring times tables facts are known for rapid recall. Making sure homework is completed and to a good standard.
Sustainability within the subject Links to real-world scenarios – farming, transporting goods etc. Discussions on how we can use Maths to improve the world.