

Maths – White Rose End Points

	Year 7
Autumn	Algebra - Sequences
	Recognise and describe linear and non-linear patterns. Continue sequences and represent them visually. Identify term-to-term rules and explain how sequences grow.
	Algebra - Algebraic notation and substitution
	Use function machines to link inputs and outputs. Substitute values accurately into expressions. Use inverse operations to find missing values.
	Algebra - Expressions and equations
	Simplify expressions by collecting like terms. Identify equivalent expressions and equations. Solve one-step and two-step equations.
	Number - Place value, ordering and rounding
	Read, write and compare integers and decimals. Use place value to explain digit value. Round numbers to powers of 10 and decimal places.
	Number - Four operations
	Add, subtract, multiply and divide integers and decimals. Use place value when multiplying/dividing by powers of 10. Apply the correct order of operations.
	Statistics – averages and range
	Calculate mean, median, mode and range. Identify averages from different data forms. Interpret and solve problems involving averages and missing values.

Spring	Number – Rounding and estimation
	Round to significant figures. Use rounding to estimate and check calculations. Identify over/underestimates.
	Statistics – graphing data
	Construct and interpret charts and graphs. Use scales, intervals and keys accurately. Describe correlations and use lines of best fit. Identify trends in data.
	Number – Fractions, decimals and percentages
	Convert between fractions, decimals and percentages. Compare and order values using diagrams. Interpret percentages as parts of 100.
	Number – Directed number
	Represent and compare positive and negative numbers. Add, subtract, multiply and divide directed numbers. Apply order of operations with negative values. Use a calculator with directed numbers.
	Number - Fractions and percentages of amounts
	Calculate fractions and percentages of amounts. Work out the whole from a known fraction or percentage. Solve increase and decrease problems.
	Geometry and measures – perimeter and area
	Convert metric units of length. Calculate perimeter and area of rectangles, parallelograms, triangles, trapezia and compound shapes. Solve problems with perimeter and area. Use formulae and algebraic expressions.

Summer	Ratio, proportion and rates of change – Speed, distance and time
	Convert between units of time. Use speed = distance $\div$ time. Interpret and draw distance–time graphs. Solve contextual speed problems.
	Number – properties of number
	Identify factors, multiples and primes. Work with square, cube and triangular numbers. Use prime factorisation for HCF and LCM. Apply number properties to simplify calculations.
	Number - Add and subtract fractions
	Convert between mixed numbers and improper fractions. Add and subtract fractions with different denominators. Use equivalent fractions to support calculations.
	Geometry and measures – angles and polygons
	Measure angles accurately and use correct notation. Calculate angles around a point, on a line and opposite. Classify polygons and use their properties. Solve problems involving angles in shapes.

	Year 8
Autumn	Ratio, proportion and rates of change - Ratio
	Represent relationships using ratio notation. Simplify ratios and compare with fractions. Share quantities in a given ratio. Solve ratio problems when whole or part is known.
	Ratio, proportion and rates of change - Proportion and scale
	Interpret direct proportion in tables and graphs. Convert between units and currencies. Use scale diagrams and maps. Identify proportional relationships in similar shapes.
	Algebra – Algebraic manipulation
	Form expressions and distinguish key algebraic types. Substitute values into expressions and formulae. Expand and factorise single brackets.
	Algebra – Coordinates and graphs
	Plot coordinates in all four quadrants. Draw and interpret straight-line graphs. Identify gradients and intercepts. $y = mx$
	Number – Multiply and divide fractions
	Multiply fractions and mixed numbers. Divide using reciprocals. Apply fraction operations in problems.
	Geometry and measures – Symmetry and reflection
	Identify lines of symmetry and rotational symmetry. Reflect shapes accurately. Use coordinate grids to describe reflections.

Spring	Geometry and measures – Area, volume and density
	Calculate area of 2-D and compound shapes. Recognise prisms and calculate volumes of cubes and cuboids. Convert between units of mass and capacity. Use density = mass ÷ volume.
	Algebra – Equations and inequalities
	Solve one-step and two-step equations. Work with brackets, fractions and unknowns on both sides. Represent and solve inequalities. Form and solve equations and inequalities.
	Number – Percentages
	Calculate percentages of amounts Use multipliers to find percentage increases and decreases. Express values as percentages or fractions Find original values before change
	Algebra - Indices
	Number – Standard form
	Convert numbers to and from standard form Compare and order values in standard form and ordinary numbers. Perform calculations using powers of 10 Use a calculator with standard form.
	Statistics – Interpret and represent data
	Identify types of data Interpret mean, median, mode and range Identify outliers in data. Compare distributions. Interpret Frequency tables and grouped data.

Summer	Geometry and measures – Angles in parallel lines and polygons
	Use alternate, corresponding and co-interior angle facts Solve problems involving parallel lines Calculate interior and exterior angles Justify solutions using angle properties
	Probability – Tables and probability
	Use probability vocabulary and scales List outcomes using sample spaces Calculate probabilities from tables Compare theoretical and experimental results
	Geometry and measures - Circles
	Use correct vocabulary for circle parts Calculate circumference and area Work with arcs, sectors and compound shapes Apply π relationships
	Statistics – Graphs and charts
	Construct and interpret bar charts, pie charts and line graphs Choose appropriate representations Compare distributions using graphs Identify misleading features
	Algebra - Sequences
	Generate terms using rules Recognise linear and non-linear patterns Use tables and graphs Describe term-to-term growth

	Year 9
Autumn	Number – Properties of number
	Use factors, multiples, primes, HCF and LCM Represent number properties using Venn diagrams Apply number relationships to simplify calculations Use prime factorisation in problems
	Number - Percentages
	Calculate percentage change using multipliers Compare values using percentages and fractions Interpret data using charts and graphs Identify misleading features
	Geometry and measures – Area and volume
	Calculate area of shapes and circles Work with nets, surface area and volume Calculate volume of cones, pyramids and spheres Convert between units
	Algebra – Equations, inequalities and formulae
	Solve equations and inequalities Work with brackets and fractional equations Substitute values into formulae Change the subject of formulae
	Number - Fractions
	Apply fraction operations in algebra Solve equations involving fractions Represent proportional relationships Work with fractions in multi-step problems

	Ratio, proportion and rates of change - Rates
	<p>Interpret and compare rates</p> <p>Use algebra to represent rate relationships</p> <p>Solve direct and inverse proportion problems</p> <p>Apply rate reasoning</p>
	Number – Standard form
	<p>Convert numbers to and from standard form</p> <p>Compare and order values</p> <p>Apply operations in standard form</p> <p>Use standard form for large/small numbers</p>
Spring	Number – Maths and money
	<p>Interpret financial information</p> <p>Compare savings, investments and borrowing</p> <p>Calculate VAT, earnings and budgets</p> <p>Use exchange rates and understand risk</p>
	Algebra – Straight line graphs
	<p>Draw and interpret straight-line graphs</p> <p>Identify gradients and intercepts</p> <p>Find equations of straight lines</p> <p>Represent inequalities on graphs</p>
	Ratio, proportion and rates of change – Ratio and proportion
	<p>Use direct and inverse proportion</p> <p>Interpret proportion and conversion graphs</p> <p>Apply algebra to ratio problems</p> <p>Explain differences between proportion types</p>
	Geometry and measures – Constructions and congruence
	<p>Construct triangles and bisectors</p> <p>Draw perpendicular lines and polygons</p> <p>Identify congruent figures</p>

	Use congruence to justify reasoning
	Geometry and measures - Similarity
	Identify similar shapes Use scale factors for lengths and angles Solve problems involving similar triangles Apply ratios in right-angled triangles
	Algebra – Algebraic manipulation
	Expand and simplify brackets Factorise expressions including quadratics Use identities to manipulate expressions Solve quadratics by factorising
Summer	Geometry and measures – Pythagoras’ theorem
	Identify the hypotenuse of a right angled triangle Apply Pythagoras’ theorem to find lengths Use the theorem in coordinate problems Apply reasoning in 3-D contexts
	Algebra – Non-linear graphs
	Recognise and interpret non-linear graphs Identify key features Use graphs to solve equations Apply non-linear relationships
	Probability – Sets and probability
	Represent sets using notation and Venn diagrams Calculate probabilities using intersections and unions Use relative frequency Determine independence and expected outcomes
	Geometry and measures - Transformations
	Enlarge shapes using scale factors Rotate, translate and reflect shapes

	Describe transformations using notation Combine transformations
	Algebra – Simultaneous equations
	Solve simultaneous equations algebraically Interpret solutions graphically Apply equations in real contexts Use substitution and elimination
	Geometry and measures - Trigonometry
	Identify sides relative to angles Use sine, cosine and tangent Apply trigonometry in multi-step problems Use exact values and combine with Pythagoras
	Year 10 Foundation
Autumn	Algebra – Algebraic manipulation
	Simplify expressions using brackets and factorising Work confidently with algebraic notation Rearrange expressions and identify structure Apply algebraic methods to solve problems
	Algebra - Equations, inequalities and formulae
	Solve linear equations and inequalities Substitute values accurately into formulae Rearrange formulae using inverse operations Interpret solutions in real contexts
	Algebra - Quadratic expressions and equations
	Expand and factorise quadratic expressions Solve quadratics using factorising Interpret quadratic graphs and roots Apply quadratics in problem-solving
	Number - Ratio and scale

	Use ratio notation and simplify ratios Apply scale factors to diagrams and maps Solve proportional reasoning problems Interpret ratio relationships in context
	Probability
	Use probability language and notation Calculate probabilities of single events Compare theoretical and experimental results Represent outcomes using tables and diagrams
Spring	Straight line graphs
	Plot and interpret straight-line graphs Identify gradients and intercepts Use $y = mx + c$ to model relationships Apply graphs to real-life contexts
	Perimeter, area and volume
	Calculate perimeter and area of 2-D shapes Work with circles, sectors and compound shapes Calculate volumes of prisms and cylinders Apply geometry to multi-step problems
	Non-linear graphs
	Recognise and interpret non-linear graphs Identify key features such as turning points Use graphs to solve equations Apply non-linear relationships in context
	Interpret and represent data
	Construct and interpret charts and diagrams Calculate averages and range, including grouped data Identify outliers and compare distributions Represent data using tables and graphs

	Rounding and estimation
	Round values to appropriate degrees of accuracy Estimate calculations to check reasonableness Identify overestimates and underestimates Use estimation in problem-solving
Summer	Angles
	Use angle facts to solve geometric problems Work with angles in polygons and parallel lines Justify reasoning using correct notation Apply angle relationships in multi-step tasks
	Graphs and diagrams
	Interpret and compare graphical representations Choose appropriate diagrams for data Identify misleading features in graphs Use diagrams to support reasoning
	Vectors
	Represent and interpret vectors Add and subtract vectors Use vector notation accurately Apply vectors to geometric problems
	Pythagoras and trigonometry
	Apply Pythagoras' theorem to find lengths Use sine, cosine and tangent to find angles Solve right-angled triangle problems Combine trigonometry with algebra and geometry
	Factors, powers and surds
	Work with prime factors and indices Simplify expressions involving powers

	Understand and manipulate surds (Higher extension) Apply powers and roots in problem-solving
	Simultaneous equations
	Solve simultaneous equations algebraically Interpret solutions graphically Apply equations in real contexts Use substitution and elimination methods

	Year 10 Higher
	Algebra - Equations, inequalities and formulae
	Solve linear and more complex equations Work with inequalities and represent solutions Substitute values into multi-step formulae Rearrange formulae including complex forms
	Algebra - Quadratic expressions and equations
	Expand double brackets and factorise quadratics Solve quadratics using factorising and graph methods Interpret roots and turning points Apply quadratics to modelling problems
	Ratio and scale

Autumn	Simplify expressions by collecting like terms. Identify equivalent expressions and equations. Solve one-step and two-step equations.
	Probability
	Use probability notation and set language Calculate probabilities for combined events Compare theoretical and experimental probability Represent outcomes using tables and diagrams
Spring	Straight line graphs
	Draw and interpret straight-line graphs Identify gradients and intercepts Rearrange equations into $y = mx + c$ Apply graphs to real-life modelling
	Perimeter, area and volume
	Calculate area and perimeter of complex shapes Work with circles, sectors and composite figures Calculate volumes of prisms and cylinders Apply geometry to unfamiliar contexts
	Interpret and represent data
	Construct and interpret statistical diagrams Work with grouped data and frequency tables Compare distributions using averages and spread Identify misleading features in data displays
	Factors, powers and surds
	Use index laws fluently Simplify and manipulate surds Apply powers and roots in algebraic contexts Work with exact values
	Pythagoras and trigonometry

	Apply Pythagoras' theorem in 2-D and 3-D Use trigonometric ratios to find angles and lengths Solve multi-step trigonometry problems Use exact trigonometric values
Summer	Vectors
	Represent vectors algebraically and geometrically Add, subtract and scale vectors Use vector notation accurately Apply vectors to geometric reasoning
	Graphs and diagrams
	Interpret complex graphs and diagrams Compare data using graphical methods Identify misleading features Use diagrams to support mathematical arguments
	Angles
	Apply angle facts in polygons and parallel lines Use reasoning to justify angle relationships Solve multi-step geometric problems Work with more advanced angle contexts
	Simultaneous equations
	Solve simultaneous equations algebraically Use substitution and elimination fluently Interpret graphical solutions Apply equations to modelling problems
	Work with fractions
	Manipulate fractions in algebraic contexts Solve equations involving fractions Use fractions to represent proportional relationships Apply fractions in multi-step problems

	Non-calculator methods
	Use efficient mental and written strategies Work with powers, roots and surds without a calculator Estimate and check calculations Apply non-calculator methods in exam-style problems
	Non-linear graphs
	Recognise and interpret non-linear graphs Identify key features such as turning points Use graphs to solve equations Apply non-linear relationships in context

	Year 11 Foundation
Autumn	Algebra - Quadratic equations and graphs
	Expand and factorise quadratic expressions Solve quadratics by factorising and graphing Interpret roots and turning points Apply quadratics to real-life contexts.
	Ratio and proportion
	Use ratio and proportion to compare quantities Apply proportional reasoning in multi-step problems Work with direct and inverse proportion Use ratio relationships in geometry and measures
	Probability
	Use probability notation and language Calculate probabilities for single and combined events Represent outcomes using tables and diagrams Compare theoretical and experimental probabilities
	Straight-line graphs and simultaneous equations

Spring	<p>Draw and interpret straight-line graphs</p> <p>Identify gradients and intercepts</p> <p>Solve simultaneous equations algebraically and graphically</p> <p>Apply equations to real-life problems</p>
	Perimeter, area and volume
	<p>Calculate perimeter and area of compound shapes</p> <p>Work with circles, sectors and composite figures</p> <p>Calculate volumes of prisms and cylinders</p> <p>Apply geometry to unfamiliar contexts</p>
	Pythagoras and trigonometry
	<p>Apply Pythagoras' theorem to find lengths</p> <p>Use sine, cosine and tangent to find angles</p> <p>Solve right-angled triangle problems</p> <p>Combine trigonometry with algebra and geometry</p>
Summer	Statistics and data
	<p>Construct and interpret charts and graphs</p> <p>Calculate averages and range including grouped data</p> <p>Identify outliers and compare distributions</p> <p>Represent data using tables and diagrams</p>
	Transformations and vectors
	<p>Enlarge rotate translate and reflect shapes</p> <p>Describe transformations using correct notation</p> <p>Represent and interpret vectors</p> <p>Apply vectors to geometric reasoning</p>

	Year 11 Higher
	Algebra - Quadratic equations and graphs
	Expand and factorise quadratics

Autumn	<p>Solve quadratics using factorising completing the square and formula</p> <p>Interpret roots turning points and symmetry</p> <p>Apply quadratics to modelling problems</p>
	Ratio and proportion
	<p>Use ratio and proportion in complex contexts</p> <p>Apply scale factors and proportional reasoning algebraically</p> <p>Work with direct and inverse proportion graphs</p> <p>Solve multi-step ratio problems</p>
	Probability
	<p>Use set notation and Venn diagrams</p> <p>Calculate probabilities for combined and conditional events</p> <p>Compare theoretical and experimental results</p> <p>Represent outcomes using tables and trees</p>
Spring	Straight-line graphs and simultaneous equations
	<p>Draw and interpret straight-line graphs</p> <p>Identify gradients and intercepts</p> <p>Solve simultaneous equations algebraically and graphically</p> <p>Apply equations to modelling problems</p>
	Perimeter area and volume
	<p>Calculate area and perimeter of complex shapes</p> <p>Work with circles sectors and composite figures</p> <p>Calculate volumes of prisms cylinders and spheres</p> <p>Apply geometry to unfamiliar contexts</p>
	Pythagoras and trigonometry
	<p>Apply Pythagoras' theorem in 2-D and 3-D</p> <p>Use trigonometric ratios to find angles and lengths</p> <p>Solve multi-step trigonometry problems</p> <p>Use exact trigonometric values</p>

Summer	Statistics and data
	Construct and interpret statistical diagrams Work with grouped data and frequency tables Compare distributions using averages and spread Identify misleading features in data displays
	Transformations and vectors
	Enlarge rotate translate and reflect shapes Describe transformations using vector notation Add subtract and scale vectors Apply vectors to geometric reasoning