

Subject: Maths

Year group: 9

Department Curriculum Vision: Northwood Mathematicians work towards fluency in Mathematics, and focus on mastering the resilience and problem solving skills essential for life beyond secondary school.

	Autumn Term 1	Autumn Term 2
Content: (Know what...)	Area, Perimeter and Volume Finding the area and perimeter of 2D shapes and the volume and surface area of 3D shapes Number and Fractions, Decimals, Percentages Learning about different types of number and the link between fractions, decimals and percentages.	Averages and Data Calculating averages, constructing and interpreting graphs. Algebraic Manipulation and Pythagoras Expanding brackets, factorising expressions and solving equations. An introduction to Pythagoras' theorem.
Skills: (know how...)	- Find the perimeter of shapes and the area of rectangles by counting squares - Find the area of rectangles and parallelograms using the formula - Find the area of triangles using the formula - Find the area of composite shapes made of rectangles and triangles - Identify and define radius, diameter, circumference, arc and sector. - Find the circumference of a circle given its diameter or radius - Find the arc length of half or quarter circles. - Find the perimeter of half or quarter circles - Find the area of a circle given its radius or diameter - Find the area of semi-circles and quarter circles	- Define and be able to identify, primary, secondary, discrete and continuous data - Define 'mean', 'mode' , 'median' and 'range' and know the differences - Find the mode, median and range for small ordered data sets - Find the mean for a set of data - Find missing numbers in a data set given one of the its averages - Use each average and the range to compare data sets and make conclusions relevant to data - Know at least one advantage and disadvantage for each average - Decide which average to use for different situations, giving reasons

- Understand when to use different measures of capacity
- Find the volume of 3D shapes by counting cubes
- Find the volume of a cuboid and cubes using the formula
- Find missing lengths of cubes and cuboids, given the volume
- Find the volume of triangular prisms
- Find the volume of cylinders
- Find the surface area of a cube, cuboid and triangular prism

- Read information from frequency tables
- Find the mode, median and mean from frequency tables
- Read information from grouped frequency tables
- State the modal group from grouped frequency tables
- Estimate the mean from a grouped frequency table
- Plot data on a scatter graph with given axes
- Draw a scatter graph and be able to identify the type of correlation
- Draw a line of best fit on a scatter graph where appropriate
- Use the line of best fit to make predictions and identify outliers
- Understand the difference between correlation and causation
- Read information from a pie chart and make simple inferences
- Draw pie charts with given segment division and by converting frequencies to angles and using a protractor

	- Find the area of trapeziums using the formula - Find missing lengths given the area of a rectangle, triangle, parallelogram or trapezium - Solve simple area problems (eg. find shaded region) - Find area, circumference and perimeter in terms of π - Find the area of composite shapes made of circle parts (half, quarter, three-quarter) - Find the volume of a prism (including with compound cross-section) - Find the surface area of cylinders - Find the surface area of compound prisms - Express perimeter, area and volume in terms of algebra	- Find missing values in a frequency table given the mean - Make comparisons using averages from a grouped frequency table - Plot a scatter diagram, describe correlation and draw inferences about the data - Identify outliers, draw lines of best fit and use them to make predictions - Understand the difference between correlation/causation and interpolation/extrapolation - Complete and draw cumulative frequency tables - Complete cumulative frequency tables and draw cumulative frequency graphs - Draw cumulative frequency diagrams and find the median - Find the quartiles, interquartile range and percentiles from a cumulative frequency diagram - Read information from a given box and whisker plot - Draw a box and whisker plot given the lowest and highest values, the median and quartiles - Compare the range, median and interquartile range from cumulative frequency diagrams and box plots, relevant to the context
	- Understand and know the square numbers up to 15×15 - Use positive integer powers and associated roots - Can find multiples of a number - Can find the LCM of a pair of numbers by listing - Can find factors of a number - Identify and understand prime numbers	- Apply basic laws of indices - multiplication law, division law, brackets - Form a basic algebraic expression - Collect like terms of more than one variable, including powers - Expand single brackets - Expand sets of single brackets and simplify

	• Write numbers as their prime factors • Write larger numbers as products of their prime factors in index notation • Use prime factor decomposition to find the HCF and LCM of a pair of numbers • Find equivalent fractions • Convert between improper fractions to mixed • Add and subtract fractions with the same and different denominator • Add and subtract mixed fractions • Find fractions of amounts • Multiply and divide fractions and mixed numbers • Find percentages of amounts using non-calculator methods • Increase or decrease amounts by a percentage (non-calculator) • Increase and decrease amounts by a percentage in context • Convert percentages to decimals • Find percentages using a calculator • Increase or decrease an amount by a percentage (using a decimal multiplier) • Convert fractions to percentages • Write amounts as a fraction or percentage of each other • Compare amounts given in different forms (fractions, decimals, percentages) • Use bar modelling as a method to solve problems	• Factorise single brackets • Solve one, two and three step equations including brackets • Solve equations with unknowns on both sides • Form and solve equations from shapes and angles • Apply Pythagoras theorem to find the longest side • Apply Pythagoras theorem to find a shorter side • Solve problems using Pythagoras Theorem
	• Find powers and roots • Estimate powers and roots of any given positive number	• Expand and simplify double brackets • Simplify algebraic fractions • Solve equations involving fractions

	• Understand and identify rational and irrational numbers • Convert fractions to decimals using division • Convert fractions to recurring decimals using division • Compare amounts by converting between decimals and fractions • Find amounts given a percentage of it • Find original amounts after a percentage increase and decrease • Calculate successive percentage change • Understand the difference between simple and compound interest • Calculate successive percentage increase and decrease • Calculate percentage change • Calculate percentage profit or loss	• Form and solve equations from shapes, angles and worded problems • Change the subject of an equation, including powers and roots • Apply Pythagoras to determine whether or not a triangle is right angled • Solve worded problems using Pythagoras Theorem
	• Solve problems involving original amounts (H) • Solve challenging problems involving percentage change (H) • Convert recurring decimals to fractions (H)	• Solve problems involving expanding double brackets e.g shape (H) • Expand triple brackets (H) • Factorise quadratic expressions (H) • Simplify and solve algebraic fractions (H) • Change the subject of an equations and formulae, including powers and roots (H) • Apply Pythagoras to find the midpoint of two coordinates (H) • Apply Pythagoras to find the height and area of an isosceles triangle (H) • Apply Pythagoras to 3D Shapes (H)

Key vocabulary	Area, perimeter, volume, types of number and fractions, decimals, percentages, powers, roots, square, cube, prime, equivalent, profit, loss, simple and compound interest, recurring.	Expand, factorise, mean, mode, median, range, indices.
Mid Term Assessment	Area, perimeter, volume	Averages and data
End Term Assessment	Area, perimeter, volume, types of number and fractions, percentages and decimals.	Averages, data, expressions, equations and Pythagoras' theorem.
	Spring 1	Spring 2
Content: (Know what...)	Angles and Trigonometry Finding missing angles in polygons (internal and external) and angles on parallel lines. Introduction to right-angled trigonometry. Substitution and Sequences Substituting into equations, finding missing terms in sequences, naming sequences, finding the Nth term of sequence.	Linear Graphs Plotting linear graphs, finding the equation of straight lines, finding the distance between two points, plotting curves.

Skills: (Know how...)	• Find missing angles around a point, on a straight line and vertically opposite • Find missing angles in a triangle • Find missing angles in multi-step problems • Identify alternate and corresponding angles • Find missing corresponding and alternate angles • Find missing angles in multi-step problems • Split regular polygons into triangles • Find the total degrees inside a regular polygon • Find one missing interior angle in a regular polygon • Know that exterior angles of polygons sum to 360 • Find exterior angles of regular polygons • Find interior angles of regular polygons by finding the exterior angle first • Identify the hypotenuse, opposite and adjacent side of a triangle • Use the sine, cosine and tangent function on a calculator • Decide which trig ratio to use when finding missing sides and angles of triangles • Find missing sides of right angled triangles • Use the inverse trig functions on their calculators • Find missing angles in right angled triangles using the inverse trig functions	• Identify and plot coordinates • Work out the midpoint of two points • Find equation of horizontal ($y=a$) and vertical ($x=b$) lines • Draw horizontal and vertical lines on a graph from their equation • Draw straight line graphs using a table of values (all quadrants) (axes given) • Identify the y-intercept of a line from a graph • Work out the gradient between two points given on a graph • Match given graphs to their equations • Write equations for given graphs in the form $y = mx + c$ (positive gradient only) • Plot quadratic curves from a given table of values • Plot and be able to recognise the graph of $y=x^2$ • Plot quadratic curves
--	---	---

	• Solve problems involving interior and exterior angles of polygons • Find angles of elevation and depression • Find missing angles or sides in multi-step problems	• Find the gradient between two points • Find the equation of a line from two given points • Decide whether a point sits on a line • Identify parallel lines from their equations • Identify parallel lines by finding their gradients • Find equations of parallel lines • Plot quadratic curves • Identify a quadratic's roots from a graph
	• Use a mixture of Pythagoras and trig to find missing lengths or angles • Problem solve using a mixture of Pythagoras and Trig • Using trigonometry in 3D shapes • Find missing angles or sides in right angled triangles (contextual problems)	• Rearrange equations to the form of $y = mx + c$ to complete tables of values and draw graphs (H) • Find equations of perpendicular lines (H) • Problem solving with Coordinate Geometry (H)
	• Substitute positive numbers into simple algebraic expressions • Substitute positive numbers into expressions involving brackets and powers • Generate integer sequences (odds, evens, squares, cubes) • Generate and recognise famous integer sequences (odds, evens, squares, cubes, Triangular numbers, Fibonacci) • Generate a linear sequence from a rule (e.g. $+ 2$) • Generate a linear sequence from an nth term (one and two terms e.g. $2n + 5$)	

	• Generate a quadratic sequence from an nth term (two operations e.g. $n^2 + 3$) • Find the nth term of a linear sequence (increasing and decreasing) • Find and continue general rules for visual sequences • Justify whether a term is in a sequence	
	• Substitute numbers (+/-) into expressions involving brackets and powers • Substitute numbers (+/-) into complex formulae • Distinguish between arithmetic and geometric progressions • Generate a quadratic sequence from an nth term (three operations e.g. $n^2 + n + 3$) • Recognise when a sequence is linear or quadratic • Find the nth term of a quadratic sequence (one, two terms and three terms, e.g. $2n^2 + n + 3$) • Find the nth term for linear sequences and solve problems • Find the nth term for quadratic sequences and solve problems • Solve problems involving sequences	
	• Understand function notation and find outputs given an input and a function • Apply composite functions • Distinguish between arithmetic, geometric and Fibonacci type progressions • Find the common difference and first term of an arithmetic progressions • Find the common ratio of and first term of geometric progressions • Solve problems relating to nth term	

Key vocabulary	Polygons, interior, exterior, opposite, adjacent, hypotenuse	Gradient, y-intercept, parallel, perpendicular, horizontal, vertical, quadratic.
Mid Term Assessment	Angles and Trigonometry	Substitution, sequences, linear graphs
End Term Assessment	Angles, trigonometry, substitution and sequences.	Linear and non-linear graphs
	Summer 1	Summer 2
Content: (Know what...)	Simultaneous equations Solving simultaneous equations graphically, by elimination and substitution (H) Inequalities Express inequalities on a number line, solve inequalities, sketch inequalities on a graph	Consolidation Retrieval of topics from throughout the year for EOY exam. End of year project / Geometry art
Skills: (Know how...)	• Solve one and two step linear equations. • Substitute a single value into a formula to find corresponding values • Solve simultaneous equations by subtraction or addition (no multiplication needed) • Solve simultaneous equations by subtraction or addition (multiplication of one equation) • Solve simultaneous equations by subtraction or addition (multiplication of both equations)	
	• Solve simultaneous equations by substitution • Solve simultaneous equations graphically (both linear)	

	• Solve simultaneous equations that require rearranging prior to solving • Solve simultaneous equations • Form and solve simultaneous equations – complex problems	
Key vocabulary	Simultaneous, elimination, linear.	
Mid Term Assessment	Simultaneous equations	
End Term Assessment	Simultaneous equations, inequalities	End of year exam (all year 9 topics)

Additional information

Homework	Sparx: Ensure you attempt all questions, watch the videos if you are unsure or seek help from your teacher if you still require help after watching the videos. You must write each bookwork code in your Sparx book and show all working out.	
Extra curricular and enrichment opportunities	Sparx club, maths club, chess club and competitions	
Useful links that will support learning	Sparx Independent Learning, https://www.mathsgenie.co.uk/gcse.html	

How parents can support learning	Check students' Sparx homework weekly to ensure that it is complete. Look at assessments and feedback in students' books. Encourage pupils to do Independent Learning on Sparx to further their knowledge and retain prior skills.
---	---