

Subject: Mathematics

Year group: 8

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...)	Algebra - Solving Equations Recap Expanding and Factorising Brackets, Solving Equations, Forming and Solving Equations Geometry - Perimeter, Area and Volume Recap perimeter and area Area of 2D Shapes, Area of Composite Shapes, Circumference and Area of a Circle, Plans and Elevations, Surface Area and Volume of 3D Shapes	Number - Ratio, Proportion & Percentages Convert Time, Write and Simplify Ratios, Share Ratio,s Adapt Recipes, Best Buy Problems, Calculate percentages of an amount, Percentage change, Write as a percentage, Draw and Interpret Pie Charts,
Skills: (know how...)	• Understand that brackets imply multiplication • Expand single brackets (including negative terms) • Expand multiple single brackets and simplify e.g. $2(x - 5) - 3(2x + 4)$ • Factorise expressions including powers of variables • Solve linear equations (including brackets and variables on both sides) • Form expressions • Form and solve linear equations • Calculate the area of a rectangle, triangle, parallelogram and trapezium using the formulae • Form and solve equations in the context of area and perimeter of triangles, rectangles, parallelograms and trapeziums • Identify the circumference, radius and diameter of a circle	• Convert time (minutes and hours) • Find equivalent ratios • Use unitary ratios • Simplify ratios • Solve recipe problems • Share in a ratio • Solve worded ratio problems • Find the amount that was shared when given the ratio and one part • Find the least sum of parts of combined ratios • Write a percentage as an amount • Find percentages of an amount • Find percentages of an amount with/without a calculator • Calculate a percentage change with/ without a calculator (increase and decrease) • Calculate compound measures using direct proportion

- Estimate the circumference of a circle by multiplying the diameter by 3
- Calculate the circumference of a circle to 1 decimal place using the formula
- Can solve problems using the formula for circumference of a circle
- Use the formulae for circumference and area of circles confidently
- Find the area of composite shapes including all the above parallelograms and trapeziums using formulae
- Solve problems e.g. rearranging formulae to find missing sides or contexts
- Can solve problems involving parts of circles - Extension: formulae for arcs
- Solve challenging problems involving composite shapes
- Identify common objects from their plan view/elevations and draw plans/elevations for common objects
- Draw plan views/side elevations of common objects, common 3D shapes and composite shapes made of cubes
- Draw plans and elevations to scale, using cm squared grid or equivalent
- Can draw a 3D sketch of an object given its plans and elevations
- Count up how many cubes make up a cuboid
- Count cubes and draw cuboids with a specified number of cubes
- Draw the net of a cube and cuboid
- Find the surface area of a cube and a cuboid
- Find the volume of a cuboid by using the formula $V = lwh$
- Identify prisms and use the formula $V = A \times \text{length}$ to find the volume of cuboids, triangular prisms, cylinder, parallelepiped, trapezoid
- Find the volume of other prisms using $V = A \times \text{length}$ (e.g.)

- Calculate unitary ratios to solve direct proportion problems
- Find proportions of a circle/ 360 degrees
- Calculate angles from a pie chart
- Draw a pie chart
- Interpret a pie chart
- Compare Pie Charts

	• Calculate the volume of composite cuboids • Solve challenging problems involving volume of cuboids e.g. using algebra, contexts, rates of flow • Solve problems involving volume of prisms e.g. composite prisms • Find the surface area of a cylinder	
Key vocabulary	Product, Variable, Term, Coefficient, Common factor, Factorise, Power, Indices, Formula, Formulae, Subject, Change the subject. Algebra, algebraic, algebraically, Unknown, Equation, Operation, Solve, Solution, Brackets, Symbol, Substitute, Graph, Point of intersection Circle, Centre, Radius, diameter, chord, circumference, π, (Right) prism, Cross-section, Cylinder, Polygon, polygonal, Solid, Volume, Surface, surface area	Ratio, Proportion, Proportional, Multiplier, Speed, Unitary method, Units, Compound unit, Compare, comparison, Part, Simplify, Common factor, Cancel, Lowest terms, Unit, Percent, percentage, Multiplier, Increase, decrease
Mid Term Assessment	Equations and Perimeter and Area (to date)	Ratio, Proportion & Percentages (to date)
End Term Assessment	Equations and Perimeter, Area & Volume	Ratio, Proportion & Percentages

	Spring 1	Spring 2
Content: (Know what...)	Statistics - Representing Data Calculating Mean, Mode, Median and Range, Comparing Averages, Calculating Averages from frequency tables, Drawing and Interpreting Distance Time Graphs Geometry - Angles Recap Properties of 2D Shapes Angles on a straight line, around a point, triangles, quadrilaterals, Angles in Parallel Lines	Geometry - Angles Angles in Polygons Probability Probability Scale, Listing Outcomes , Single events, Relative frequency, Calculate probabilities from: Frequency trees, Venn diagrams, Sample Space, Two-way tables
Skills: (Know how...)	- Find the mean, median, mode and range for a given data set - Find missing data given the mode or range - Compare two sets of data using averages - Solve problems involving mean, median, mode and range. - Establish the most useful average for a context - Solve more complex problems involving averages (e.g. following data replacement) - Work out change in averages if a piece of data is replaced - Find missing data given two or three of the mean, median, mode and range - Define and identify discrete and continuous data - Read information from frequency tables - Find the mean, mode and range from frequency tables - Draw Distance Time Graphs - Interpret Distance Time Graphs - Use mathematical notation on diagrams	- Name all common polygons and their properties - Find the angle sums of polygons up to decagon and calculate missing angles. - Use the formula for finding the angle sum of any polygon - Know that the sum of exterior angles of any polygon is 360o - Calculate missing exterior angles - Find the size of each interior angle of regular polygons - Solve problems involving the interior and exterior angles of polygons - Match probabilities to the probability scale and language - Calculate simple single event probabilities - Understand key terms : event, outcome, result. probability - List a set of outcomes - Understand the difference between theoretical and experimental probabilities - Calculate relative frequencies - Use relative frequencies to predict outcomes - Complete a frequency tree

	• Calculate missing angles around a point and on a straight line • Calculate missing angles in different types of triangles • Calculate missing angles in quadrilaterals • Calculate vertically opposite angles • Calculate missing angles around a point, on a straight line, vertically opposite, in a triangle and in a quadrilateral and give reasons • Identify pairs of corresponding and alternate angles • Calculate vertically opposite angles, alternate and corresponding angles and give reasons • Use a combination of angle rules to solve multistep problems, giving reasons • Use algebra to solve problems and prove angle facts • Prove angles in a triangle add up to 180° using parallel lines	• Use and calculate with a frequency tree • Calculate probabilities from a frequency tree • Form a sample space diagram • Calculate probabilities from a sample space diagram • Complete and use a two way table • Use two way tables to calculate probabilities • Understand and use a venn diagram • Complete a venn diagram • Complete more complex venn diagrams (with fractions) • Use venn diagrams to calculate probabilities • Construct and use venn diagrams (including 3 sets diagrams)
Key vocabulary	Average, Spread, Consistency, Mean, ,Median, Mode, Range, Measure, Data, Statistic, Statistics, Approximate, Round degrees, Right angle, acute angle, obtuse angle, reflex angle, Vertically opposite, Geometry, geometrical, Parallel, Alternate angles, corresponding angles	Interior angle, exterior angle, Regular polygon Probability, Theoretical probability, Event, Outcome, Impossible, Unlikely, Evens chance, Likely, Certain, Equally likely, Mutually exclusive, Exhaustive, Possibility space, Experiment
Mid Term Assessment	Data and Angles (to date)	Polygons and Probability (to date)

End Term Assessment	Data and Angles	Polygons and Probability
	Summer 1	Summer 2
Content: (Know what...)	Algebra - Sequences Sequences	Geometry - Transformations Transformations
Skills: (Know how...)	- Recap Substitute into simple algebraic expressions with brackets and indices - Continue integer sequences using all four operations and state their rules - Continue sequences with fractions and decimals and state their rules - Recognise and continue Fibonacci style and other special sequences - Find missing terms in Fibonacci style sequences - Continue patterns by drawing the next terms - Record results of growing patterns and describe rules for them in words - Use position-to-term rules given in words to continue patterns and generate linear sequences - Find term-to-term rules for linear sequences - Use given nth term rules to generate terms of linear sequences - Understand that the times tables can be written as n, $2n$, $3n$ etc. - Find and use nth term for linear sequences including negative linear sequences	- Plot coordinates in all four quadrants - Solve problems using coordinates grid - Recognise and draw lines in the form $x=a/y=b$ or $y=x$ - Translate shapes by instruction - Translate shapes from vectors - Draw lines of symmetry on shapes - Reflect shapes in given horizontal, vertical and diagonal mirror lines - Reflect shapes in lines given in the form $x=a/y=b$ or $y=x$ - Find the order of symmetry of shapes - Rotate objects using tracing paper around a given point - Find the centre of rotation using trial and error - Enlarge shapes by a positive integer scale factor - Find the scale factor of enlargement from two similar shapes - Enlarge shapes by a positive integer scale factor - Find the scale factor of enlargement from two similar shapes - Enlarge a shape through a centre of enlargement (integer scale factor and fractional) - Describe and do combined transformations

	- Find and use the nth term of an arithmetic sequence to generate a given term - Decide if a given number is a term in the sequence - Solve problems relating to patterns	
Key vocabulary	Sequence, Linear, Term, Difference, Term-to-term rule, Position-to-term rule, Ascending, Descending	(Cartesian) coordinates, Axis, axes, x-axis, y-axis, ,Origin, Quadrant, Translation, Reflection, Rotation, Transformation, Object, Image, Congruent, congruence, Mirror line, Vector, Centre of rotation
Mid Term Assessment	Sequences (to date)	Transformation (to date)
End Term Assessment	Sequences	End of Year Exam (all 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	Mathematics masterclasses: club for students who enter the UKMT challenge, 24 game Hillingdon challenge. Times Tables Rockstars House competition.	

Useful links that will support learning	Sparx Independent Learning
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.