Sheldon School
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Curriculum Plan
KS3 – Mathematics
Year 8

Golden Threads

There are six key areas of study throughout – Number, Algebra, Ratio and Proportion, Geometry and Measure, Probability, and Statistics. Whilst these areas can appear distinct, students are encouraged to see the connections across mathematical ideas. We also look to develop their fluency, mathematical reasoning and competence in solving increasingly sophisticated problems.

Enrichment

UKMT Junior Maths Challenge

Weekly puzzle club

Careers links, Bletchley Park trip

Review and Evaluation

July 2025

Topics & Substantive Knowledge	Assessment	Misconceptions	Key Vocabulary	Knowledge Tracking
Ratio and Scale This unit introduces the concept of a ratio. It then moves onto sharing in a ratio and simplifying ratios before exploring the link between ratio and fractions. • Defining and representing ratios and ratio notation • Sharing ratios given the whole or one of the parts • Simplifying ratios • Compare ratios and fractions • Understand gradient as a ratio (Higher only)	End of Term 1 – In class, 45minute assessment on the first three blocks of learning.	Confusing ratios and fractions. Not understanding that ratios and proportions are stated differently.	Equal parts Equivalent Place-holder Proportion Ratio Relationship Share Simplify Units Slope (H)	**Already Seen:** N/A **To Build Towards:** Year 9 Term 3 - Revise and Extend Year 8 Knowledge Year 10 Term 4 – Ratio and Fractions
Multiplicative Change This unit builds upon the work with ratio to introduce the idea of direct proportion, linking to graphs and the wider context. This provides opportunities for problem solving. • Link between ratio and scaling, including the idea of direct proportion. • Linked to context – conversion graphs, maps with scales etc. • Scale factors		Not understanding that scales are multiplicative, but thinking that they are additive.	Approximation Axes Conversion Currency Enlargement Exchange Rate Image Linear Orientation Origin Plan Scale Factor Variable	**Already Seen:** Year 7 Term 3 – Convert Metric Units Year 7 Term 5 – Use multiplicative relationships **To Build Towards:** Year 9 Term 2 – Revisit scale drawings Year 9 Term 5 – Solve direct proportion problems, Inverse proportion
Multiplying and Dividing Fractions Students will have had a little experience of multiplying and dividing fractions from Year 6. Here we deepen our understanding by looking at what underpins the algorithms. • Multiplying and dividing fractions by an integer or a fraction • Understand the reciprocal • Multiplying and dividing improper and mixed fractions • Multiplying and dividing algebraic fractions		When multiplying by an integer, also multiplying the denominator. When dividing fractions, flipping the first fraction instead of the second	Commutative Denominator Numerator Product Quotient Reciprocal Square Unit Fraction Whole Simplest Form (H)	**Already Seen:** Year 7 Term 2 – Interchange between fractions and decimals below 1 Year 7 Term 3 – Find fractions of an amount **To Build Towards:** Year 9 Term 3 - Recap fraction arithmetic

Term 1

Topics & Substantive Knowledge	Assessment	Misconceptions	Key Vocabulary	Knowledge Tracking
Cartesian Plane Students will look at algebraic rules for straight lines, focussing on using the equations to produce the lines rather than looking at y=mx+c in depth as this will be covered in year 9. Students will also be appreciating the similarities and differences between sequences, lists of co-ordinates and lines. • Coordinates in all 4 quadrants • Identify and draw lines that are parallel to the axes • Recognise and use lines in the form y=kx • Recognise, plot and use lines in the form y=x+a • Explore graphs with a negative gradient • Link graphs to linear sequences • Plot graphs in the form y=mx+c • Explore non-linear graphs (Higher Only) • Find the mid-point of a line segment (Higher Only)	End of Term 2 – In class, 45minute assessment all Term 1 & 2 topics.	Confusing the x and y axis. Not connecting the points on a straight line graph. Confusing the gradient with the y intercept when given an equation. Incorrectly substitute negative values into expressions/equations of lines.	Ascending Axis/Axes Coordinates Descending Equidistant Horizontal Intercept Linear/Non Linear Midpoint Multiple Multiplier Origin Quadrant Scale Scale Segment Symmetrical Unitary Vertical	**Already Seen:** Year 7 Term 1 - Representing functions graphically) **To Build Towards:** Year 9 Term 1 - y=mx+c, parallel and perpendicular lines
Representing Data Students are introduced to bivariate data and the idea of linear correlation. They extend their knowledge from KS2 to deal with both discrete and continuous data. • Draw and interpret scatter graphs • Understand and describe linear correlation • Draw and use line of best fit • Identify non-linear relationships • Construct and interpret two-way tables		Incorrectly drawn axes, where values are not equally spaced	Correlation Decrease Extrapolate Frequency Increase Negative Outlier Percentage Positive Relationship Variable	**Already Seen:** N/A **To Build Towards:** Year 9 Term 6 – Revise Year 8 Knowledge Year 10 Term 5 – Frequency polygons, Time series, Box plots, Histograms, Comparing distributions using diagrams Links to Science (lines of best fit are straight in Maths but can be curved in Science)

Term 2

Topics & Substantive Knowledge	Assessment	Misconceptions	Key Vocabulary	Knowledge Tracking
Brackets, Equations and Inequalities Building on their understanding of equivalence from Year 7, students will explore expanding over a single bracket and factorising by taking out common factors. We will look at the important skill of forming equations as well as the skills needed to solve them • Expanding over a single bracket • Expanding over double brackets (Higher Only) • Factorising by taking out common factors • Solving equations including brackets and unknowns on both sides • Learning to solve inequalities • Learning the meaning of a solution set • Modelling solutions mathematically • Substituting numerical values into formulae and expressions • Collecting like terms • Using algebraic methods to solve linear equations with one variable	End of Term 3 – In class, 45minute assessment on the three Term 3 blocks of learning.	Incorrectly expanding by not multiplying the terms, but adding instead. Not applying the inverse operation to both sides when solving equations When expanding double brackets, if one term is negative, subtracting instead of multiplying Incorrectly substitute negative values into expressions (especially when using powers).	Binomial Coefficient Common Factor Directed Equations Equivalent Expand Expressions Factor Factorise Factors HCF Identity Inequalities Like/Unlike terms Positive/Negative Product Quadratic Simplify Solution Set Solve Substitute Variable	**Already Seen:** Year 7 Term 1 – Form and solve one-step equations Year 7 Term 4 – Form and solve two-step equations **To Build Towards:** Year 9 Term 1 – Form and solve equations and inequalities with unknowns on both sides Year 9 Term 6 – Representing inequalities Year 10 Term 1 – Represent solutions to inequalities on number lines
Sequences This short block extends students learning from the start of Year 7, including more complex algebraic rules. • Finding the nth term of a linear sequence (Higher Only) • Generating terms from a term-to-term rule or a position to term rule • Recognising arithmetic and geometric sequences			Coefficient Constant Difference Linear/Non-linear Sequence	**Already Seen:** Year 7 Term 1 – Recognise linear and non-linear sequences, Generate sequences from an algebraic rule **To Build Towards:** Year 9 Term 1 – Testing conjectures about sequences Year 10 Term 5 – Revise and extend KS3 content
Indices This block lays the groundwork for the addition and subtraction of indices by making sure students are comfortable with expressions involving powers (e.g. $3x^2 y$). • Using and interpreting algebraic notation eg $a3$ in place of $a \times a \times a$ etc. • Using language accurately to analyse algebraic expressions • Begin to model situations mathematically • Substitute values into expressions • Rearrange and simplify expressions • Solve equations involving indices		Not putting brackets around negative numbers when squaring them on a calculator	Base Denominator Exponent Indices/Index Numerator Powers	**Already Seen:** N/A **To Build Towards:** Year 9 Term 1 – Revise and extend Year 7 and 8 coverage Year 10 Term 6 – Work with powers and roots

Term 3

Curriculum Plan
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	Topics & Substantive Knowledge	Assessment	Misconceptions	Key Vocabulary	Knowledge Tracking
Term 4	**Fractions, Decimals and Percentages** This block focusses on the relationships between fractions and percentages, including decimal equivalents. This is used to work out percentage increase and decrease. This block will develop both calculator and non-calculator methods. • Expressing one number as a fraction of another • Comparing two quantities using percentages • Financial Maths – profit, loss and interest • Find the original value after a percentage change (Higher Only)	End of Term 4 – In class, 45minute assessment all Term 3 & 4 topics.	Understanding that decimals and fractions are not different types of numbers. Thinking that values over 100% don't exist.	Decimal Decrease Denominator Equivalent Fraction Increase Integer Interest Numerator Percentage Profit	**Already Seen:** Year 7 Term 3 – Find fractions of an amount, Solve problems with fractions greater than 1, Find percentage of amount using mental and calculator methods **To Build Towards:** Year 9 Term 3 – Reverse percentages, Financial maths Year 10 Term 2 – Working with fractions, simple and compound interest, repeated percentage change
	Standard Form Higher strand students will have briefly looked at standard form (A×10^n) in year 7 and now this topic is introduced to all students, building on their work on indices last term. This topic uses context to help students make sense of the need for the notation and its uses. • Interpret and compare numbers in standard form • Add, subtract, multiply and divide numbers in standard form • Understand negative and fractional indices (Higher Only)		Incorrectly writing standard form where the value at the front is not between 1 and 10.	Base Commutative Exponent Indices Place value Power Reciprocal Scientific Notation	**Already Seen:** Year 7 Term 2 – Write 1sf numbers in standard form **To Build Towards:** Year 9 Term 3 – Standard form
	Number and Units This block gives students the opportunity to revisit basic skills in a wide variety of contexts. The basic skills are: • Rounding numbers to a given number of decimal places or significant figures • Estimation • Use of metric units of mass, length, time and money • Solving problems involving time and the calendar • Understand error interval notation (Higher Only)		Not applying significant figures correctly (e.g. counting leading zeros or keeping trailing zeros in answers).	Credit Debit Decimal Place Dimensions Integer Metric Nearest Order Overestimate Round Significant Underestimate Units Bound (H) Continuous (H) Discrete (H)	**Already Seen:** Year 7 Term 2 – Understand and use place value, Round numbers to powers of 10 and 1sf **To Build Towards:** Year 10 Term 5 – Upper and lower bounds, Converting recurring decimals

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Term 5	**Angles in Parallel Lines and Polygons** This unit builds upon KS2 and Year 7 understanding of angle notation and relationships, exploring angles in parallel lines. This allows us to solve more complex missing angle problems. Links are then made to polygons • Understanding angle notation and relationships • Explore angles in parallel lines (alternate, corresponding and co-interior angles) • Understand angles in special quadrilaterals • Understand the sum of exterior and interior angles of a polygon • Prove simple geometric facts (Higher Only)	End of Term 5 – In class, 45minute assessment on the two Term 5 blocks of learning.	Not remembering angles around a point sum to 360, thinking it's 180. Adding all angles on the same line together even if they are in different places. Confusing alternate and corresponding angles.	Acute Adjacent Alternate Co-interior Corresponding Equilateral Exterior Interior Isosceles Obtuse Parallel Reflex Regular Right Angle Scalene Supplementary Transversal	**Already Seen:** Year 7 Term 5 – Angles at a point, Angles in triangles and quadrilaterals, Angles on a straight line **To Build Towards:** Year 9 Term 2 – Chains of reasoning to find angles Year 10 Term 5 – Interpret and use bearings
	Area of Trapezia and Circles Students following the higher strand will have been introduced to the formulae of a trapezium in Year 7. This topic is now introduced to all students as well as the formula of a circle. • Area of rectangles, triangles, parallelograms and trapezia • Calculate perimeter and area of compound shapes • Calculate area of a circle and parts of a circle with and without a calculator • Understand Pi as a ratio		Confusing area and perimeter. Forgetting to halve in triangle and trapezium area calculations. Not using the perpendicular heights for area calculations	Area Component Shapes Compound Diameter Estimate Formula Perimeter Pi Radius	**Already Seen:** Year 7 Term 3 – Area of rectangles, triangles and parallelograms **To Build Towards:** Year 9 Term 4 – Surface area of cuboids and cylinders, Volume of cuboids, cylinders and prisms

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Topics & Substantive Knowledge	Assessment	Misconceptions	Key Vocabulary	Knowledge Tracking
Data Handling Cycle Continuing study of statistics at primary school and Year 7 and 8. Focus on using charts to compare different distributions including where graphs may be misleading. Data collection including designing and analysing questionnaires. • Mean from grouped and ungrouped frequency tables • Looking at outliers and impact on measures of spread and average, and whether to include or exclude them from the calculations	End of Term 6 – End of Year assessment on all Year 8 topics. In class - 45minutes.	Confusing the x and y axis. Angles in pie charts incorrectly drawn. Not using a new reference point for their measuring. Incorrectly using a protractor for measuring angles (e.g. using the wrong zero). Incorrectly drawn axes, where values are not equally spaced.	Biased Bivariate Comparison Consistent Continuous Discrete Frequency Hypothesis Investigation Primary/Secondary Data Proportion Range Sample Tally	**Already Seen:** Year 7 Term 2 – Find the median and the range Year 7 Term 5 – Find the mean **To Build Towards:** Year 9 Term 6 – Revise Year 7 and 8 coverage
Measures of Location Students have met the median and mean earlier in KS3. This block introduces the mode and also looks at when and why each average should be used • Construct and interpret appropriate tables, charts and diagrams including frequency tables, bar charts and pie charts • Describe, interpret and compare observed distributions of a single variable through appropriate graphical representation • Looking at continuous/discrete date and measures of average and spread		Students often confuse the 3 averages with one another. Students often write the frequency as the answer instead of the class interval when asked for the median.	Average Estimate Mean Median Midpoint Mode/Modal Outlier Subtotal	**Already Seen:** Year 7 Term 2 – Find the median and the range Year 7 Term 5 – Find the mean **To Build Towards:** Year 10 Term 5 – Find the modal class, Compare distributions
Line Symmetry and Reflection This block is designed to build confidence with shapes and lines in different orientations. Knowledge of special triangles and quadrilaterals is enhanced • Describe sketch and draw lines, parallel and perpendicular lines, right angles, regular and other polygons that are reflectively and rotationally symmetric • Identify properties of and describe the results of reflections applied to given figures			Congruent Equilateral Image Isosceles Object Parallel Perpendicular Polygon Regular Vertex	**Already Seen:** Year 7 Term 5 – Draw lines, angles and simple shapes **To Build Towards:** Year 9 Term 2 – Standard ruler and compass constructions Year 9 Term 4 – Recognise rotational symmetry, Rotate points around a given points

Term 6