Oldbury Wells

KS3 Progression Grid - Maths

	STRAND 1 Number	STRAND 2 Algebra	STRAND 3 Ratio & Proportion	STRAND 4 Geometry & Measures	STRAND 5 Probability & Statistics
9	**All the below and…** • Interpret and use algebraic reasoning to justify numerical results. • Recognise the infinite nature of integer, rational and real number sets. • Calculate and simplify surds and express roots in simplest radical form. • Solve problems involving rationalising denominators. • Apply the laws of indices to negative and fractional powers.	**All the below and…** • Interpret linear and quadratic graphs to estimate approximate solutions. • Rearrange complex formulae including powers and fractional terms. • Expand and simplify expressions involving three or more brackets. • Factorise quadratic expressions where a = 1. • Solve quadratic equations by factorisation (a = 1).	**All the below and…** • Calculate density = mass ÷ volume and pressure = force ÷ area. • Interpret gradient as rate of change. • Express direct and inverse proportion algebraically. • Apply area and volume scale factors for similar shapes.	**All the below and…** • Apply trigonometric ratios to calculate missing sides and angles. • Solve real-life right-angled triangle problems. • Solve three-dimensional problems using Pythagoras and trigonometry.	**All the below and…** • Interpret bias and reliability in data collection. • Draw, interpret and compare box plots. • Compare distributions using measures of center and spread. • Construct tree diagrams and calculate probabilities (to include dependent events).
8	**All the below and…** • Use error bounds and inequalities to describe rounding accuracy. • Interpret rounding limits using inequality notation. • Apply laws of indices, including zero powers. • Calculate with fractions, ratios, percentages and powers.	**All the below and…** • Solve linear inequalities and represent solutions graphically and algebraically. • Recognise and generate geometric sequences. • Recognise quadratic sequences from term-to-term and position-to-term rules.	**All the below and…** • Calculate percentage change including repeated change. • Use and interpret simple interest formulae. • Model inverse proportion using tables, graphs and equations.	**All the below and…** • Identify congruent and similar shapes using formal criteria. • Enlarge shapes by integer and fractional scale factors. • Calculate missing sides using Pythagoras. • Justify geometric proofs using angle facts and congruence.	**All the below and…** • Interpret scatter graphs to describe correlation and causation. • Draw and use lines of best fit. • Identify outliers and anomalies. • Construct tree diagrams and calculate probabilities.
7	**All the below and…** • Calculate compound percentage change (growth and decay). • Solve financial mathematics problems (profit, loss, VAT, interest). • Interpret ratio and proportion involving decimals and percentages. • Use estimation and inverse operations to check results.	**All the below and…** • Expand and simplify double brackets. • Represent quadratic relationships graphically. • Interpret graphs to find approximate solutions of equations.	**All the below and…** • Solve multi-step problems involving direct and inverse proportion. • Combine ratios involving three or more quantities.	**All the below and…** • Construct triangles using SSS, SAS and ASA. • Interpret and use scale drawings and map scales. • Interpret and calculate bearings, including three-figure bearings. • Recognise perpendicularity and gradient relationships. • Form and justify equations from angle facts.	**All the below and…** • Calculate probabilities of combined events. • Distinguish between dependent and independent events. • Compare experimental and theoretical probability. • Construct scatter graphs
6	**All the below and…** • Recognise and calculate with square and cube numbers and roots. • Express numbers in prime factor form using index notation. • Calculate the highest common factor (HCF) and lowest common multiple (LCM). • Apply the laws of indices for positive integer powers. • Use standard form and convert between representations. • Use significant figures to interpret exact and approximate values.	**All the below and…** • Solve linear equations with brackets and variables on both sides. • Form and solve equations from worded and geometric contexts. • Draw, interpret and use linear graphs with positive and negative gradients.	**All the below and…** • Calculate using scale factors in maps and diagrams. • Convert between metric units, including area and volume. • Calculate compound units such as speed and density. • Solve reverse percentage problems.	**All the below and…** • Use corresponding, alternate and vertically opposite angles. • Calculate volume and surface area of simple 3-D solids. • Calculate interior angles of polygons. • Construct perpendicular and angle bisectors.	**All the below and…** • Compare distributions using averages and range (grouped data). • Use of set notation •

5	**All the below and…** • Convert fluently between fractions, decimals and percentages. • Calculate percentage increase and decrease. • Interpret percentages as operators. • Use a calculator accurately for multi-step problems.	**All the below and…** • Substitute values into formulae. • Rearrange simple formulae to change the subject. • Construct and interpret straight-line graphs (y = mx + c). • Factorise expressions by taking out common factors.	**All the below and…** • Solve direct proportion problems using tables and graphs. • Recognise and interpret y = kx. • Identify constants of proportionality. • Solve unit pricing and scaling problems.	**All the below and…** • Calculate surface area and volume of cubes and cuboids. • Convert between units of area and volume. • Calculate area of circles and trapezia. • Calculate missing angles using known angle facts.	**All the below and…** • List outcomes systematically for one- and two-stage events. • Represent sample spaces using diagrams and tables. • Calculate probabilities of mutually exclusive events.
4	**All the below and…** • Calculate using decimal and fractional operations. • Apply order of operations (BIDMAS). • Use reciprocals in scaling contexts.	**All the below and…** • Expand and simplify expressions with a single bracket. • Form and solve two-step linear equations. • Recognise and describe arithmetic sequences. • Interpret gradient and intercept from graphs.	**All the below and…** • Calculate percentages to compare quantities. • Recognise proportional and non-proportional relationships. • Convert between fractions, decimals, percentages and ratios.	**All the below and…** • Calculate circumference of circles. • Calculate area and perimeter of composite shapes. • Interpret nets of 3-D shapes. • Recognise reflective and rotational symmetry.	**All the below and…** • Plan and carry out data collection. • Select appropriate graphs. • Compare distributions using averages and range (list of numbers) • Draw frequency polygons. • Represent combined events using two-way tables, frequency trees and Venn diagrams.
3	**All the below and…** • Add and subtract decimals and fractions. • Recognise and calculate equivalent fractions. • Convert between mixed numbers and improper fractions. • Use estimation to check solutions.. • Round values to a given number of decimal places or significant figures.	**All the below and…** • Simplify expressions by collecting like terms. • Expand single brackets and simplify. • Solve one-step equations using inverse operations.	**All the below and…** • Recognise relationships between fractions and ratios. • Use the unitary method to solve problems. • Calculate and interpret ratio sharing problems.	**All the below and…** • Calculate area and perimeter of rectangles, triangles and parallelograms. • Convert between metric units. • Recognise properties of 3-D shapes.	**All the below and…** • Construct frequency tables (discrete and continuous) • Construct and interpret all bar charts and pie charts. • Calculate and interpret the mean. • Compare data sets and Identify trends in data (including line graphs).
2	**All the below and…** • Use negative numbers in context. • Add and subtract integers. • Recognise factors, multiples and prime numbers. • Recognise square and cube numbers. • Understand decimal place value	**All the below and…** • Write expressions to describe patterns. • Identify terms, coefficients and variables. • Plot and interpret coordinates in four quadrants.	**All the below and…** • Recognise and represent ratios using the : symbol. • Simplify ratios. • Share quantities using part–part and part–whole ratios. • Interpret bar models.	**All the below and…** • Classify triangles and quadrilaterals. • Recognise parallel and perpendicular lines. • Identify 3D shapes from nets. • Work with standard units of time, mass, length and capacity.	**All the below and…** • Construct and interpret simple bar charts and pictograms. • Calculate mode, median and range. • Construct Stem and Leaf Diagrams. • Recognise that total probability adds up to 1.
1	**Can…** • Read, write, order and compare integers. • Understand place value up to 1 000 000. • Recall multiplication and division facts to 12 × 12. • Round whole numbers.	**Can…** • Recognise and continue simple patterns. • Use letters to represent unknowns. • Substitute values into simple expressions and formulae.	**Can…** • Recognise equal groups. • Use multiplicative language such as double and half. • Describe simple ratios in words.	**Can…** • Recognise and name 2-D and 3-D shapes. • Identify lines of symmetry. • Measure and draw lengths and angles accurately.	**Can…** • Collect and organise data(tally). • Interpret simple charts. • Use basic statistical vocabulary. • Use probability language and the 0–1 scale.