Curriculum Overview: Maths

The KS2 Maths Curriculum at PBA has been designed using the White Rose Units (with some small amendments to suit the needs of our cohorts). Lessons are taught in blocks using the small steps to ensure detailed coverage. We use starters in lessons to recap areas of learning throughout the year using a combination of the 'Flashback Four' resources from White Rose and our own gap analysis. The KS3/4 curriculum is a progression model based on Oat Maths; it enables students at all levels of attainment to practise fluency, to reason and to think mathematically at every possible opportunity. The principle of White Rose small steps is incorporated into the curriculum. Each year, topics are generally revisited to consolidate prior learning before building new learning.

Year Group	Content overview Cycle 1	Content overview Cycle 2	Content overview Cycle 3
5	**Place Value** - up to 1,000,000 including comparing, ordering and rounding. **Addition and Subtraction** - formal written methods. Multiplication and Division - number facts and multiply and divide by powers of 10. **Fractions A** - equivalents, ordering and comparing, converting fractions and addition and subtraction.	**Multiplication and division** - Formal written method of short division, long and short multiplication and division with remainders. **Fractions B** - multiply fractions, fractions of an amount. **Decimals and Percentages** - ordering decimals up to 3DP, understanding percentages, rounding decimals, fraction decimal and percentage equivalents. **Perimeter and Area** - perimeter and area of rectangles and compound shapes, estimating area. **Statistics** - draw and interpret line graphs, timetables, two-way tables,	**Shape** - classify angles, draw and measure angles, angles on a straight line and a point, regular and irregular polygons, 3D shapes. **Position and Direction** - symmetry, reflection, translation with coordinates, all in only one quadrant. **Decimals** - adding and subtracting decimals and multiplying and dividing by powers of 10. **Negative Numbers** - understand negative numbers, comparing negative numbers, calculating across zero. **Converting Units** - converting metric units of measure, converting units of time. **Volume** - understanding the concept, comparing and estimating (including capacity).
6	**Place Value** - Up to 10,000,000, including negative numbers, comparing ordering and rounding. **Addition, Subtraction, Multiplication and Division** - formal written methods, including long/short multiplication and division, number facts, BIDMAS.	**Ratio** - vocabulary and scale factor. **Decimals** - place value up to 3DP (including rounding), multiply and divide by powers of 10 and multiplication and division. **Fractions Decimals and Percentages** - finding equivalences between fractions, decimals and percentages including ordering and comparing and finding percentages.	**Shape** - measure, classify and draw angles, angles around a point, straight line and in a triangle, opposite and missing angles, circles and nets. **Application of skills projects** - combining skills learnt from different units this year to complete small projects: Design a garden, Kandinsky Art, Data Collection. **Algebra** - 1 and 2 step function machines, simple formulae,

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	Fractions A - equivalents fractions and addition and subtraction. **Fractions B** - multiply and divide fractions and fractions of amounts. **Position and Direction** - reflections, translations and coordinates up to 4 quadrants.	**Area, Perimeter and Volume** - including rectilinear shapes, triangles and parallelograms, volume without cubes. **Converting Units** - metric measures and imperial conversions. **Statistics** - line graphs, pie charts, dual bar graphs, the mean.	substitution, solving one and 2 step equations. **Year 7 Transition unit** – Calculators.
7	**Place value and written methods** – Written methods with integers; Place value; Rounding to 10, 100, 100; Rounding to 1 or 2 d.p; Round to 1 sig figure and estimating **2D and 3D shapes** – Recognise and name 2D and 3D shapes; Find perimeters of basic and compound shapes; Find areas of rectangles and triangles using formula and counting; Converting units of metric length **Number properties and types -** Identify types and properties of numbers (prime, multiple factor, square, cube, odd, even); Find Prime factors; Find HCF and LCM by listing **Charts and averages -** Collect data and tally charts; Construct and interpret bar charts and pictograms; Calculate mean, mode, median and range **Angles and triangles -**Naming and classifying angles; Naming types of triangles; Drawing and measuring angles **Decimals and directed numbers -** Perform the four operations with decimals; Understand and order directed numbers; Perform the four operations with directed numbers;Solve problems involving money, mass and time	**Algebra introduction** - Read and understand the terminology and structure of algebraic terms and expressions; Collect like terms; Add, subtract, multiply and divide simple terms; Substitution **Fractions** -Shade and identify fractions drawings; Find equivalent fractions; Simplify fractions; Convert improper fractions and mixed numbers; Calculate fractions of amounts; Perform the four operations with fractions and mixed numbers **Coordinates** - Read and plot coordinates in 4 quadrants; Identify missing coordinates on shapes **Quadrilaterals and properties of shape** - Classify quadrilaterals; Identify and draw line and rotational symmetry in shapes; Interpret and draw simple plans and elevations of simple shapes; Interpret nets of simple shapes **Percentages**- Find percentages of an amount without a calculator; Increase and decrease by a percentage; Match simple fractions decimals and percentages; Calculator methods with percentages **Language of probability** - Understand what is meant by a probability; Understand the language used to describe probability; Place probability language on a the probability scale	**Angle rules**- Angles on a straight line and at a point; Angles in triangles and quadrilaterals; Vertically opposite angles; Angles in parallel lines (co-interior, corresponding, alternate) **Sequences** - Generate and describe patterns from pictures and numbers; Common sequences; Generate and interpret term to term rules for sequences **Ratio** - Read and writing simple ratios; Sharing an amount in a given ratio **Order of operations** - Understand and use the rules of bidmas **Simple transformations**- Identify and construct reflected shapes; Identify and construct rotated shapes; Identify a translation and translate a shape

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8	**Polygons** - Names and angles in polygons; Calculations with interior and exterior angles; Calculate areas of trapezium and parallelogram **Solving equations** - Expanding brackets and simplifying; Solving linear equations **Fractions, decimals and percentages** - Converting and comparing fraction, decimal and percentages; Converting simple recurring decimals **Circles** - Calculate the circumference and area of a circle; Calculate the area and perimeter of sectors **Volume and surface area** - Calculate 3D shape surface area (cuboids and prism); Calculate the volume of 3D shapes (cuboid and prism) **Sequences**- Finding and using the nth term rule for linear sequences; Generating a sequence from an nth term rule; Plot values from an nth term rule against position **Loci and construction** - Constructing triangles (SAS, ASA and SSS); Construct angle bi-sectors and perpendicular line bisectors; Draw loci paths and regions including: equidistant from a point, a line, between 2 points, between 2 lines.	**Accuracy and using a calculator** - Using a scientific calculator and it's functions effectively; Round solutions to a given accuracy; Work out intervals and bounds for rounded numbers and calculations **Equations of straight lines** -Understand the straight line format y=mx+c; Calculate gradient from a line segment or coordinates; Plotting lines from a table of values; Read and state the equations of vertical and horizontal lines **Representing data** - Understand different types of data (discrete, continuous, qualitative, quantitative, primary, secondary); Design and critique surveys; Interpret and construct pie charts and stem and leaf diagrams **Proportion** - Understand the concepts of direct and inverse proportion; Plotting the relationships of proportion; Answer questions on recipe problems; Use conversion graphs; Calculate values using proportion **Probability** - Calculate probability of a single event; Interpret and construct sample space diagrams; Reason and estimate with experimental probability and relative frequency	**Averages from tables** - Averages from frequency tables for discrete data **Using formulae and equations** - Expand and factorise single brackets; Form and solve equations for problems; Change the subject of a formula; Using algebra in different context for problem solving **Using graphs** - Know and use the distance, speed and time relationship for constant speed; Read, interpret and construct speed/time graphs; Use and read information from graphs in context **Transformations**- Reflection in lines; Rotation of shapes from a point by a given amount; Translation of shapes using a vector; Enlargements of shapes by a given scale and centre; Read and make scale drawings **Targeted problem solving and projects** - Targeted mini project or problem solving activities
9	**Congruence and construction-** Angle rule revision; Identify and calculate values in congruent shapes and triangles; Know and use the special conditions for congruent triangles; Accurately construct triangles; Identify angles in tessellating polygons **Index laws** - Understand how to use the laws of indices to simplify formulae **Standard form** - Write large and small numbers in standard form; Converting standard form numbers to normal form; Perform calculations	**Bivariate data** -- Interpret and plot scatter diagrams; Understand and name the different types of correlation; Use a scatter diagram to interpolate and predict **Continuous data** - Interpret and populate grouped frequency tables; Know how to calculate an estimated mean from a grouped frequency table; Plot frequency polygons **Further percentages** - Know how to use a decimal multiplier for percentage change; Calculate repeated percentage change in steps and with the formula; Calculate an original amount using a reverse percentage change	**Further straight line graphs**- Know how to solve a linear equation with it's graph; Find the equations of parallel and perpendicular lines; Form the equation of line through a point and gradient; Form the equation of a line through 2 points **Introduction to quadratics** - Expand 2 (and 3) brackets; Factorise simple quadratics; Plot quadratics using a table of values; Find estimated solutions to quadratics graphically **Quadratic and geometric sequences** - Identify common sequences; Classify sequences from their properties (linear, quadratic, geometric, Fibonacci); Generate sequences from their term to term rule or nth term rule; Find the nth term for

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	with standard form numbers both with and without a calculator **Inequalities** - Representing inequalities on a line and cartesian plane; Solve inequalities algebraically; Find integer solutions for inequalities **Similar shapes**- Understand the definition for similar shapes; Identify and find missing values in similar shapes and triangles; Know and use the special conditions for similar triangles; Calculate and use linear, area and volume scale factors; Make links between angle rules in parallel lines and similar triangles **Pythagoras**- Know and use the Pythagoras formula; Find missing sides in triangles using Pythagoras; Use Pythagoras to solve perimeter problems of other compound shapes; Solve problems in context with triangles	**Compound units --**Revise the graphs and formula for distance speed and time (including the graph); Know and calculate with the unit of pressure; Know the formula and calculate with density; Convert compound units into different units **Further probability** - Understand what is meant by exhaustive events; Calculate missing probabilities from exhaustive events; Interpret and construct frequency trees, Venn diagrams and probability trees; Know the product rule and develop a systematic listing strategy **Right angled triangle trigonometry** - Fully label the sides of a right angles triangle; Learn the ratios of Sine, Cosine and Tangent to use sohcahtoa; Find missing sides in right angled triangles using the trig ratios; Find missing angles in right angled triangles using the trig ratios	quadratic and geometric sequences **Using prime factors** - Find HCF and LCM from prime factors Find cube roots from prime factors
10	**Processing and representing data -** Statistical calculations from lists and tables; Presenting data - bar charts, pie charts; Box plots, histograms (H) **Number skills and properties**- Written methods; Factors, multiples and primes; HCF, LCM **Algebraic manipulation and quadratics** - Expand and simplify; Factorise; Simplify algebraic fractions; expand quadratics; factorise quadratics; rearrange formulae; Laws of indices **Fractions and decimals**- Order fractions; written methods with fractions; Order decimals; Written methods with decimals; Convert decimals and fractions; Convert recurring decimals **Accuracy and bounds-** rounding; estimating; Error intervals; Calculations with bounds	**Constructions and loci-** Bisectors; Loci; Constructions **Percentage change** - Expressing percentages; repeated percentage change; reverse percentage change; Growth and decay **Ratio and proportion** - Sharing in a ratio; best buy problems; direct and inverse proportion; graphs of proportion; problem solving **Solving equations and quadratics** - Solving linear equations; Solving quadratics by factorising; solving quadratics on a graph; Solving quadratics by completing the square; Using the quadratic formula **Indices and surds -** Recognise Powers; Calculate with roots and integer/fractional indices; Simplify surds (H); rationalise denominators(H)	**Straight line graphs-** Work with coordinates; Plot straight line graphs; Use y=mx+c; find equations of lines; Point where 2 lines cross **Simultaneous equations** - Solve 2 equations algebraically; Solve 2 equations graphically; Form, solve and interpret equations **Inequalities** - Solve linear and quadratic inequalities; represent inequalities on a line; represent inequalities on a graph **2D and 3D shapes** - Properties of polygons 2D representations of 3D shapes

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	2D and 3D shapes - Perimeter and Area rectilinear shapes and circles; Volume and surface area **Trigonometry** - Pythagoras; Trigonometry with Right angled triangles; Exact values		
11	**Geometric review and circle theorems (H) -** Angles, scale drawings and bearings; Circle Theorems (H) **Standard form**- Convert standard form; Simple standard form calculations and comparisons **Real life graphs and measures** - DST graphs; Gradient as rate of change; Converting standard measures; compound units (density and pressure); Area under a curve **Bivariate data**- scatter graphs; Correlations; line of best fit **Probability -** Probability scale; Calculating probability; tables, sample space, Venn and tree diagrams; dependant and combined events; Conditional probability; Sets **Transformations** - 4 transformations; fractional and negative enlargements; describing multiple transformations **Congruence and similarity** -Congruent triangles; similar shapes and triangles; length area and volume relationships	**Sequences -** Generate sequences; Nth term of linear and quadratic sequence; recognise standard sequences **Functions**- Interpret expressions as functions; inverse and composite functions **Solving equations revision (F)** - revision and practice **Numerical methods (H)**- solving using iterative methods **Further graphs-** Find solutions to equations graphically; Sketch and interpret quadratic graphs; recognise cubic and reciprocal graphs; recognise and use trigonometric graphs; Equation of a circle **Number revision (F)** - revision and practice **Transformation of functions (H)** - Translations and reflections of functions; **Geometry revision (F)** - revision and practice **Scalene trigonometry (H)** - Sine and cosine rules; Area of triangle	**Vectors -** Add and subtract vectors; column and diagram representation of vectors; proof with vectors **Exam preparation**