KS3 Course Overview - TERM 1 (7 weeks)		
Y7: Geometry, Number	**Y8: Number, Probability**	**Y9: Number, Algebra**

Y7: Geometry, Number	Y8: Number, Probability	Y9: Number, Algebra
Geometry Measuring lines Measuring and labelling angles Drawing lines and angles accurately Use compasses Construction of triangles 2d shapes (quadrilaterals and triangles) – names and properties Drawing 2d shapes accurately Perimeter v area (definition only) Similar and congruent shapes **Integers** What is a number? Base 10 Comparing integers Significant figures Number sentences Additions, subtractions, multiplication, division Commutative, associative, distributivity Directed numbers Types of numbers LCM, HCF	**Number Revision:** Distributivity of multiplication over addition: 4x53 = 4x (50+3) = 4x50 + 4x3 and link to long multiplications and grid methods (D) Use for mental maths and best strategy (S) Operations with decimals (place value): × & ÷ by 10, 100, 1000 (D) 0.1, 0.01, 0.001 (S) Prime number decomposition (D) HCF, LCM from product of prime factors (S) (Venn diagrams; common prime factors) *Extend to algebraic expressions (M)* **Estimating:** Decimal places (D) and significant figures (S) Estimating operations using rounding (S) Include estimating √ (S) Upper and lower bound (S) error interval (S) *and single operations with UB LB (M)* **Fractions:** Equivalent fractions (D), Fractions of quantities (D), Order fractions (S), equivalence between 2/5 and 2x 1/5 + - × ÷ fractions (S) Mixed number fractions (S) Fractions of a fractions Four operations involving a fraction & an integer *If time: simple algebraic fractions +-x (M)* **Probability** Emphasise use of correct vocabulary and notation Theoretical vs. experimental probability (D) NOT rule (1-p), OR rule (S) Vocab: mutually exclusive events vs. independent events Sample Space diagrams (S) Frequency trees (S) *Number of possible outcomes by × (M)* *AND Rule (M)*	**Number** HCF, LCM (from factor decomposition) Operations with decimals (see Y8 column) Rounding and Estimating (S) including √ (S) Error intervals: Upper, lower bound (S) and operations (H) **Laws of indices**: Emphasize the use of correct voca (base, index, reciprocal/inverse) + - × a⁰ (D) negative (H) fractional (H) and with algebra (H) **Standard form:** Ordinary numbers <-> standard form (D) Multiplication/division of numbers in standard form (S); Addition/ subtraction of numbers in standard form (M) Calculator with standard form (S) **Algebraic Manipulation** Substitution, simplifying, expanding and factorise linear (D) and quadratics (S) Solve linear equations: 2 ops, negative, fractional answers (D), brackets or unknown on both sides (S) Linear inequalities (S) Change the subject 1-step (D), 2-steps (S), 3-steps (M), including when subject appears on both sides (M) or with powers (H) Making y the subject (S) Rearrange when x is the denominator (preparation for trig) (S) Recognise geometric/arithmetic/Fibonnacci sequences (D) nth term of arithmetic sequences(S) Quadratic sequences (H) **Functions** f(a) (D), f(x)=a, composite functions (H), inverse functions (H)

Note: the superscript in "+ - × a⁰ (D)" represents a^0.

KS3 Course Overview: Term 2		
Y7: Fractions, decimals, ratio and percentage (BAR MODEL)	**Y8: Algebra, Angles**	**Y9: Trigonometry, Area & perimeter, Transformations**
Fractions Bar model for fractions 4 operations with fractions Problem solving including reverse fractions Converting between fractions and decimals Converting between fractions and percentages Ratio	**Laws of indices:** Emphasize the use of correct vocab (base, index, reciprocal/inverse) First 4 laws (+-×a⁻) (S); negative index (M) (include negative/fractional base (M)) Standard form <-> "normal" numbers (S) **Algebraic Manipulation** Substitution, simplifying expressions, expanding / factorise single brackets (D) including when common term is a bracket (S) Construct and solve simple equations: two operations (D), with negative and fractional answers (S) with brackets (S), *unknown on both sides (M)* Expanding 2 lots of 1 bracket & simplify (S) Expanding double brackets (S) *Specifically cover difference of 2 squares and expanding binomial squares $(a\pm b)^2$* **Angle reasoning:** Straight line around a point, triangles including isosceles triangles (D) Opposite angles (S) Alternate, corresponding and co-interior angles (S), co-interior angles (S) Bearings (S) Special properties of quadrilaterals (angles, sides, diagonals) – especially parallelograms and kites(S) Combine algebra with angle problems (S)	**Trigonometry** Pythagoras (S) Trig ratio: missing angle, missing side (S) Trigonometric Problems (M) **Area, Perimeter, Volume:** Revise angles in triangle and parallel lines(D) Area of all 2D shapes (D), compound shapes (S), including "in terms of π" (S) Use algebra to solve geometric problems (S) Volume and Surface areas of cuboids (D) and other prism (S). Naming parts of a circle (S) *Arc length, area of a sector as a fraction of the circumference/area of a sector (M)* Converting measures of area and volume (S) **Transformations** Translation, Rotation (D) Reflection using equation of a line (S) Enlargement (S) with Fractional (M) and negative scale factors (H) Similar shapes: linear scale factor (S) area and volume scale factor (H)

KS3 Course Overview: Term 3		
Y7: Algebra (BAR MODEL)	**Y8: Ratio & proportions, Percentages (Emphasise bar model and links)**	**Y9: Fractions, Ratio & proportions, Percentages (Emphasise bar model and links)**

Language
Forming expressions
Using algebra tiles to form expressions
Simplifying
Substitution
Solving 1 and 2 step equations
Changing the subject
Brackets - expand and factorise (link to product of prime factors and factors)
Functions (link to equations, not compound or inverse)
	Ratio & Proportion:
	Equivalent ratios, share quantity by given ratio (D) using ratios to solve problems (S)
	
	Using graphs to solve proportionality Q. (S))
	Problem with proportions:
	    - Best value for money, recipe (D),
	    - currency and units (S)
	    - multi-step problems (M)
	Solutions might be integers or rational
	Worded inverse proportion problems (M)
	
	Percentages:
	Calculating % of an amount (D)
	Writing a quantity as a % of another (S)
	Percentage profit/loss (S)
	Using % in context/problems (M)
	Problem mixing % fractions ratios (M)
	Introduce multiplier (Link bar model) (S)
	Percentage increase & decrease (S)
	
	Using calculators:
	Understand your calculator (D), Operations with brackets, √, indices, fractions (D), complete advanced calculations (S)
	Substitution in formulas; using calculators (area, volumes, including cones and spheres)
	Change the subject: 1-2 operations (D) 3+ operations (S) and applications (S)
	(mandatory: formulas from science, ie
	w=m x g; momentum = mass x velocity ...)
		Fractions
		Fractions: Simplifying, all operations (D) (including indices) Mixed fractions (S)
		Fractions of an amount (D)
		Converting recurring decimals into fraction (H)
		
		Algebraic fractions: simplify, add, multiply (H) requiring linear factorizing (H)
		Fraction of an amount in context – pie charts, expectation (proba.), stratified samples, time to decimal, etc (S/M)
		
		Ratio Proportions
		EVERY TYPE OF RATIO QUESTION:
		Equivalent ratios, sharing in a ratios (D), knowing the difference (S) combining 2 ratios (A:B B:C... A:C) (S)
		Forming an equation from a ratio (M)
		Recap on proportions, best buys, unit conversions, recipes (D)
		Inverse proportions in word problems (M)) (6 painters 8 days, how long for 5 painters)
		
		Direct proportions (D), inverse proportions (M)
		Including graphically (H)
		
		Percentage
		"Mental strategies" vs multiplier (S)
		% of, % increase, decrease (D)
		Percentage profit/loss (S)
		Compound interests (M)
		Reverse % (M)
		Solve practical problems involving % (S / M)

KS3 Course Overview: Term 4

NUMERACY WEEK – CROSS CURRICULAR APPLICATION OF MATHEMATICS

Y7: Geometry	Y8: Algebra	Y9: Algebra
Area and perimeter (10 lessons) Angles and angle reasoning (5 lessons)	Linear Inequalities (S/M) **Functions** Function notation; f(4) vs. f(x)=4 (S) **Graphs:** Plotting linear graphs from a table of values (D); y-intercept (D) x-intercept (S) Plotting quadratic and cubic (from tables of values) (S) Graphing a function y=f(x) (S) Check algebraically if a point belongs to a line (substitute) (M) Reading values from the graphs to solve equations graphically. (S) Role of x-intercept as roots/solutions (M) Find gradient of a line: y=mx + c (M) **Sequence:** Arithmetic sequences (next term, nth term) (S), geometric sequences (next term only), Fibonacci (S) Iterative sequences (u_1=..., u_{n+1}=f(u_n)) (S) *Link between graphs and sequences must be established.*	**Linear graphs & Equation of a line** Drawing linear graphs from tables of values (D) Linking and calculating gradient and y-intercept from table of values (S) and writing linear equation from table of values (S) Checking algebraically if a point belongs to a line (H) or if it is above or below (H) Solving linear equations graphically (S) Finding the equation of a line from its graph (S) Interpreting real-life graphs (D) Gradient from 2 points (S), Equation of a line from 2 points (M), parallel gradients (H) and perpendicular gradients (H) leading to equation of parallel and perpendicular lines (H) **Simultaneous equations** Solving linear simultaneous equations graphically (H) Solving linear simultaneous equations by elimination (M) and substitution (M) **Quadratic Equations** Expanding double brackets (D) Factorising monic quadratics (H) and solving (H) Develop fluency expanding $(a\pm b)^2$ and (a+b)(a-b) Complete the square (H) Drawing quadratic graphs (S) Maths literacy: roots, y-intercept, turning point, l of symmetry (M) Solving equations graphically (M)

KS3 Course Overview: Term 5		
Y7: Algebra	**Y8: Data handling, Geometry**	**Y9: Geometry, Surds**
Coordinates Equation of a line from a table of values Notice steps (gradient) and intercept Sequences	**Data Handling** Discrete vs. Continuous data (D) Constructing (D) Interpreting frequency tables (S): extracting information and identifying outliers (S) Calculate mode, median & mean from list of values (D), from frequency tables (S) and grouped frequency data (M) (using Σf and Σfx) DISCUSS OUTLIERS and when to ignore outliers if calculating the mean (S) Graphs (data <->graph and interpreting): Stem-leaf diagrams, pie charts, bar charts (D) Scatter graphs (S) Converting graph into a table (S) Constructing and interpreting a Frequency Polygons (S) **Perimeter, Area, Volume** Area, perimeter of triangles, rectangles (D) parallelogram, trapezium (S) circles (S) compound shapes (M) Volume, surface area of all prisms (S) (cuboids being a special case) Algebraic problems with area / volume (S)	**Measures** Compound measures (Speed Distance Time, *density*) (S) Interpret distance-time graphs (S) speed time graphs (M) Interpret real-life graphs that model real-life situations – gradient as rate of change (M) **Surds** Simplify (H), multiply and divide (H), add (H) expand brackets (H) Substitute and simplify with surds (H) **Geometrical Reasoning** Properties of quadrilaterals (especially angles and diagonals) (S) Angle reasoning: parallel lines, triangles (D) Bearings (S) Exterior and interior angles of polygons (S) First 4 circle theorems: semi circle, centre/circumference, same segment, cyclic quadrilateral (H) *(introduce proofs)* *Problem solving with circle theorems (trig, parallel lines, algebra etc)*

KS3 Course Overview: Term 6		
Y7: Transformations, Decimals	**Y8: Measures, Construction, Transformations**	**Y9: Construction, Probability, Data handling**
Decimals: Place value 4 operations Ordering Rounding to decimal places and significant figures **Transformations:** Reflections Rotations Translations Enlargements	**Measures** Converting metric units: meters (D), grams, litres (D), area, volumes (S) Working with scales and maps (M) Converting time to decimals and fractions (S), SDT (M) *At this stage, SDT graphs are not required.* **Construction** Construction of triangles, perpendicular / angle bisector (S) Scale drawing (S) **Transformations (creating, describing)** Translation, Rotation (D) Reflection (equation of lines) (D) Enlargement – using a centre (S) **Consolidate Y8 work + Problem solving.** Use end of year test to decide areas to consolidate.	**Construction** Constructions of triangles and bisectors, parallel lines, right angle, midpoint, rhombus Plans, elevation, nets (D) Loci and regions (S) **Probability (combined events**) OR, NOT (D) AND rules (S) Sample space diagrams Venn diagrams and probability (M) 2 way tables and probability (M) Frequency tree (S) Probability tree diagrams (M) **Data Handling** Scatter graphs (S) Averages, range (D) and Quartiles (S) Interpreting frequency tables (S): extracting information and <u>identifying outliers (S)</u> <u>DISUSS OUTLIERS and when to ignore outliers if calculating the mean (S)</u> Constructing and interpretation of cumulative frequency curves (H), Estimating quartiles (H) Constructing box plots (H) Interpreting and comparing box plots (central tendency and spread) (H) **Data Project** Revision of pie charts (D), frequency polygons (S) vs. cumulative frequency graphs (H), histograms (H), Misleading graphs