Hampshire Services
HIAS SCHOOL IMPROVEMENT

KS3 Assessment Model : Year 9

Year 9	Number	Algebra	Ratio, Proportion and Rates of Change	Geometry and Measure	Probability	Statistics
Fluency Reasoning Problem solving	**Establish** when to use additive or, multiplicative from the underlying structure of a problem when working numerically **Apply** appropriate calculation strategies and degrees of accuracy to increasingly complex problems	**Use** algebra to generalise arithmetic and to formulate mathematical relationships **Move** fluently between different representations such as algebra, graphs and diagrams	**Establish** when to use proportional reasoning from the underlying structure of a problem when working numerically **Use** formal mathematical knowledge to solve and devise problems, including in financial mathematics	**Reason** deductively in geometry **Apply** elementary knowledge to multi-step and increasingly sophisticated problems	**Model** situations mathematically and express the results using a range of formal mathematical representations	**Develop** reasoning in different areas of mathematics and begin to express their arguments formally
Phase 1 inc. Y.8	**Interpret** and compare numbers in standard form $A \times 10^n$ $1 \leq A < 10$, where n is a positive or negative integer **Work** interchangeably with terminating decimals and their corresponding fractions **Use** a calculator and other technologies to calculate results accurately and then interpret them correctly **Use** conventional notation for powers, roots and reciprocals **Appreciate** the infinite nature of the sets for integers, real and rational numbers	**Use** linear and quadratic graphs to estimate values of y for given values of x and vice versa and to find approximate solutions of simultaneous linear equations **Recognise**, sketch and produce graphs of linear and quadratic functions of one variable with appropriate scaling, using equations in x and y and the Cartesian plane **Reduce** a given linear equation in two variables to the standard form $y = mx + c$	**Solve** problems involving percentage change, increase, decrease and simple interest . **Use** compound units such as speed and unit pricing to solve problems.	**Draw** and measure line segments and angles in geometric figures, including interpreting scale drawings Derive and illustrate properties of triangles, quadrilaterals, circles, and other plane figures [for example, equal lengths and angles] using appropriate language and technologies] **Calculate** and solve problems involving: perimeters of 2-D shapes (including circles), areas of circles and composite shapes **Interpret** mathematical relationships both algebraically and geometrically	**Generate** theoretical ~~sample~~ spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities.	**Construct** and interpret pie charts and line graphs. Describe , interpret and compare measures of central tendency
Phase 2	**Use** integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 and distinguish between exact representations of roots and their decimal approximations	**Interpret** mathematical relationships both algebraically and graphically **Calculate** and interpret gradients and intercepts of graphs of such linear equations numerically, graphically and algebraically. **Model** situations or procedures by translating them into algebraic expressions or formulae and by using graphs	**Solve** problems involving direct and inverse proportion, including graphical and algebraic representations	**Derive** and apply formulae to calculate and solve problems involving prisms including cylinders **Know** and use the criteria for congruence of triangles **Apply** angle facts, triangle congruence, similarity and properties of quadrilaterals to derive results about angles and sides, including Pythagoras' Theorem, and use known results to obtain simple proofs	**Enumerate** sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams	**Describe** simple mathematical relationships between two variables (bivariate data) in observational and experimental contexts and illustrate using scatter graphs.
Phase 3	**Use** approximation through rounding to estimate answers and calculate possible resulting errors expressed using inequality notation $a < x \leq b$	**Find** contextual approximate solutions to contextual problems from given graphs of a variety of functions, including piece-wise linear, exponential and reciprocal graphs	**Use** compound units such as density to solve problems.	**Derive** and use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/at a given point, bisecting a given angle); recognise and use the perpendicular distance from a point to a line as the shortest distance to the line **Use** Pythagoras' Theorem and trigonometric ratios in similar triangles to solve problems involving right-angled triangles		Construct and interpret tables, charts and diagrams including stem and leaf and frequency tables.

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