LITTLE HEATH SCHOOL KS3 ASSESSMENT CRITERIA: Mathematics

	Number	**Algebra**	***Ratio, Proportion and Rates of Change***	**Geometry and Measures**	***Probability and Statistics***
KS3 Overview	• *consolidate their numerical and mathematical capability from key stage 2 and extend their understanding of the number system and place value to include decimals, fractions, powers and roots* • *select and use appropriate calculation strategies to solve increasingly complex problems* • *use language and properties precisely to analyse number* • *interpret when the structure of a numerical problem requires additive, multiplicative or proportional reasoning* • *move freely between different numerical representations*	• *use language and properties precisely to analyse algebra* • *use algebra to generalise the structure of arithmetic, including to formulate mathematical relationships* • *substitute values in expressions, rearrange and simplify expressions, and solve equations* • *develop algebraic and graphical fluency, including understanding linear and simple quadratic functions* • *identify variables and express relations between variables algebraically and graphically* • *make and test conjectures about patterns and relationships; look for proofs or counterexamples* • *move freely between different algebraic representations*	• *extend and formalise their knowledge of ratio and proportion in working with measures and geometry, and in formulating proportional relations algebraically* • *move freely between different graphical representations* • *interpret when the structure of a numerical problem requires additive, multiplicative or proportional reasoning*	• *use language and properties precisely to analyse 2-D and 3-D shapes* • *begin to reason deductively in geometry including using geometrical constructions*	• *use language and properties precisely to analyse probability and statistics* • *explore what can and cannot be inferred in statistical and probabilistic settings, and begin to express their arguments formally.*

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Higher(Comprehensive/ Accurate/Highly developed Success)	• **Comprehensive** understanding of place value and be able to order positive and negative integers and decimals, using =, ≠, <, >, ≤, ≥ • **Accurately** interpret and compare numbers in standard form • use concepts of prime numbers, factors, multiples, common factors, common multiples, HCF and LCM and prime factorisation, including product notation and the unique factorisation property with **highly developed success** • **Accurately** use all operations with integers, decimals, proper and improper fractions and mixed numbers using the order of operations alongside, including powers and roots. • Be able to use exact roots and decimal	• **Accurately** use and interpret algebraic notation including ab, 3y, $\frac{x}{y}$, x^2, brackets and coefficients • substitute numerical values into formulae and expressions, including scientific formulae with **highly developed success** • **Comprehensively** understand and use concepts and vocabulary of expressions, inequalities, terms and factors • **Accurately** simplify algebraic expressions by collecting like terms, expanding brackets and factorising • Rearrange formulae to change the subject **accurately** • **Accurately** model situations or procedures by translating them into algebraic expressions or formulae and by using graphs • Solve linear equations in one variable with **highly developed success** • Work with coordinates in all four quadrants with **highly developed success**	• change **accurately** between related standard units and write in the form 1:n and n:1 • use scale factors, scale diagrams and maps with **highly developed success** • express one quantity as a fraction of another **accurately** • use ratio notation with **highly developed success** • **Accurately** divide a given quantity into two parts in a given part:part or part:whole ratio; express the division of a quantity into two parts as a ratio • **Comprehensive** understanding that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction • relate the language of ratios and the associated calculations to the arithmetic of fractions and to linear functions	• Derive and apply formulae to **accurately** calculate and solve problems involving perimeter and area of triangles, parallelograms, trapezia and volume of cuboids and other prisms • Calculate and solve problems with circles and composite shapes with **highly developed success** • Draw and measure line segments and angles in geometric figures with **highly developed success** • derive and use the standard rule and compass constructions such as perpendicular bisectors, a perpendicular to a given line from/at a given point and angle bisectors **accurately** • describe, sketch and draw using conventional terms and notations (points, lines, parallel lines, perpendicular lines, right angles and polygons that are reflectively and rotationally symmetric • **Accurately** use standard conventions for labelling sides and angels and know the criteria for congruency of triangles	• Record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, equally and unequally likely outcomes, using appropriate language and the 0-1 probability scale with **highly developed success** • **Accurately** enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams • Generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities with **highly developed success** • **Comprehensively** describe, interpret and compare observed distributions of a single variable through:

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	approximations with **highly developed success** ● Work interchangeably with fractions, decimals and percentages ● **Comprehensive** understanding of percentages as 'number of parts per hundred' and work confidently with percentages, including percentages greater than 100% ● Use standard units with different quantities and change between them **accurately**. ● Round integers and decimals appropriately including significant figures and use this to estimate calculations with **highly developed success** and calculate possible resulting errors expressed using inequality notation $a<x\leq b$	● recognise, sketch and produce graphs of linear and quadratic functions of one variable using x and y ● **Comprehensively** interpret mathematical relationships both algebraically and graphically ● calculate and interpret gradients and intercepts of linear equations numerically, graphically and algebraically with **highly developed success** ● **Accurately** 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 equations ● Find approximate solutions to contextual problems from given graphs of a variety of functions including piecewise linear, exponential and reciprocal graphs ● **Accurately** generate terms of a sequence from term to term or position to term rules	● solve problems involving percentage change with **highly developed success** ● solve problems involving direct and inverse proportion with **highly developed success** ● use compound units such as speed, unit pricing and density to solve problems with **highly developed success** ● **Comprehensively** understand gradient of a line as a ratio	● derive and illustrate properties of triangles, quadrilaterals, circles and other geometrical figures with appropriate **comprehensive** language. ● be able to recognise transformations such as translation, reflection rotation and be able to recognise and describe them with **highly developed success** ● Be able to **accurately** construct similar shapes using enlargement and describe enlargements ● apply the properties of angles at a point, angles on a straight line and vertically opposite angles with **highly developed success** ● **Comprehensively** understand the relationships with angles in parallel lines such as corresponding and alternate angles ● Derive the sum of angles in a triangle and use it to work out the angles in any polygon and derive properties of regular polygons ● **Accurately** apply angles facts, triangle congruence, similarity and properties of quadrilaterals	appropriate graphical representation involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers) ● **Accurately** construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data ● Describe **comprehensive** mathematical relationships between two variables (bivariate data) in observational and experimental contexts and illustrate using scatter graphs.

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		• Recognise arithmetic sequences and find the nth term with **highly developed success** • Recognise geometric sequences and appreciate other sequences that arise		to derive results about angles and sides, including pythagoras' theorem, and use known results to obtain simple proofs • Be able to use pythagoras' theorem with **highly developed success** and trigonometric ratios in similar triangles to solve problems involving right-angled triangles	
Intermediate(Effectively/Confidant/Sound)	• **Effectively** understand place value and be able to order positive and negative integers and decimals, using =, ≠, <, >, ≤, ≥ • interpret and compare numbers in standard form **effectively** • **Confident** to use concepts of prime numbers, factors, multiples, common factors, common multiples, HCF and LCM and prime factorisation, including product notation and the unique factorisation property	• **Confidently** use and interpret algebraic notation including ab, 3y, $\frac{x}{y}$, x^2, brackets and coefficients • substitute numerical values into formulae and expressions **effectively**, including scientific formulae • **Sound** understanding and use concepts and vocabulary of expressions, inequalities, terms and factors • simplify algebraic expressions by collecting like terms, expanding brackets and factorising **confidently** • Rearrange formulae to change the subject **effectively**	• change **effectively** between related standard units and write in the form 1:n and n:1 • use scale factors, scale diagrams and maps with **sound understanding** • **Confidently** express one quantity as a fraction of another • use ratio notation • divide a given quantity into two parts in a given ratio **effectively** • **Sound** understanding that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction	• Derive and apply formulae to **confidently** calculate and solve problems involving perimeter and area of triangles, parallelograms, trapezia and volume of cuboids and other prisms • **Sound understanding** of how to calculate and solve problems with circles and composite shapes • Draw and measure line segments and angles in geometric figures • derive and use the standard rule and compass constructions such as perpendicular bisectors, a perpendicular to a given line from/at a given point and angle bisectors **confidently**	• **Confidently** record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, equally and unequally likely outcomes, using appropriate language and the 0-1 probability scale • **Confidently** enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams • **Sound ability** to generate theoretical sample spaces for single and combined events

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	• Be able to use all operations with integers, decimals, proper and improper fractions and mixed numbers using the order of operations alongside, including powers and roots **effectively** • **Confidently** work interchangeably with fractions, decimals and percentages • define percentages s 'number of parts per hundred' and work **confidently** with percentages, including percentages greater than 100% • **Sound understanding** of standard units with different quantities and **effectively** change between them. • **Confidently** round integers and decimals appropriately including significant figures and use this to estimate calculations	• **Confident** in modelling situations or procedures by translating them into algebraic expressions or formulae and by using graphs • **Confidently** Solve linear equations in one variable • Work **confidently** with coordinates in all four quadrants • **Confidently** recognise, sketch and produce graphs of linear and quadratic functions of one variable using x and y • **Confidently** Interpret mathematical relationships both algebraically and graphically • **Effectively** calculate and interpret gradients and intercepts of linear equations numerically, graphically and algebraically • **Effectively** use linear and quadratic graphs to estimate values of y for given values of x and vice versa	• relate **sound** language of ratios and the associated calculations to the arithmetic of fractions and to linear functions • compare using ratios • solve problems involving percentage change • solve problems involving direct proportion • use compound units such as speed and density to solve problems **confidently**.	• **Effectively** describe, sketch and draw using conventional terms and notations (points, lines, parallel lines, perpendicular lines, right angles • **Sound understanding** of standard conventions for labelling sides and angels and know the criteria for congruency of triangles • **Confidently** derive and illustrate properties of triangles, quadrilaterals, circles and other geometrical figures with appropriate language. • be able to **soundly** recognise transformations such as translation, reflection rotation and be able to recognise and describe them • Be able to **confidently** construct similar shapes using enlargement and describe enlargements • apply the properties of angles at a point, angles on a straight line and vertically opposite angles **effectively** • **Sound** understanding of the relationships with angles in parallel lines such as	with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities. • **Effectively** describe, interpret and compare observed distributions of a single variable through appropriate graphical representation involving discrete, continuous and grouped data • **Confidently** describe, interpret and compare appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers) • Construct and interpret frequency tables, bar charts, pie charts, pictograms and vertical line (or bar) charts • **Soundly** describe simple mathematical relationships between two variables (bivariate data) in observational and experimental

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		• generate terms of a sequence from term to term or position to term rules • Recognise arithmetic sequences with **sound understanding**		corresponding and alternate angles • **Confidently** derive the sum of angles in a triangle and use it to work out the angles in any polygon and derive properties of regular polygons • Be able to use pythagoras' theorem	contexts and illustrate using scatter graphs.
Foundation (Some/Basic/Limited access)	• understand **basic** place value and be able to order positive and negative integers and decimals, using =, ≠, <, >, ≤, ≥ • use **basic** concepts of prime numbers, factors, multiples, common factors, common multiples, HCF and LCM and prime factorisation • Be able to use all **basic** operations with integers and decimals and apply order of operations to these, including powers and roots • Work interchangeably with fractions, decimals and percentages	• **Some** use and interpret algebraic notation including ab, 3y, $\frac{x}{y}$, x^2, brackets and coefficients • **Basic understanding** to substitute numerical values into formulae and expressions, including scientific formulae • **Basic** understanding and using concepts and vocabulary of expressions, inequalities, terms and factors • simplify algebraic expressions by collecting like terms, expanding brackets and factorising at **basic level**	• change freely between related **basic understanding** of standard units • use scale factors, scale diagrams and maps with **limited access** • use **basic understanding** to express one quantity as a fraction of another • use ratio notation • use **basic understanding** to divide a given quantity into two parts in a given ratio • understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction	• derive and apply **basic** formulae to calculate and solve problems involving perimeter and area of triangles, parallelograms, trapezia and volume of cuboids • show **basic understanding** in drawing and measuring line segments and angles in geometric figures • derive and use the **basic** standard rule and **basic** compass constructions such as perpendicular bisectors and angle bisectors • use **some understanding** to describe, sketch and draw using conventional terms and notations (points, lines, parallel lines, perpendicular lines, right angles • use standard conventions for labelling sides and angels and	• Record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness and equally likely outcomes, using appropriate language and the 0-1 probability scale • Understand that the probabilities of all possible outcomes sum to 1 • Describe, interpret and compare appropriate **basic understanding of** graphical representations involving discrete, continuous and data

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	• Define percentages s 'number of parts per hundred' and work confidently with percentages • Use standard units with different quantities and change between them **using some understanding** • Round integers and decimals appropriately	• **Apply limited** understanding to rearrange formulae to change the subject • Solve **some** linear equations in one variable • Work with coordinates in all four quadrants • recognise, sketch and produce graphs of linear and quadratic functions of one variable using x and y with **limited understanding** • generate terms of a sequence from term to term or position to term rules using **basic understanding**	• relate the **basic** language of ratios and the associated calculations to the arithmetic of fractions and to linear functions • solve **basic** problems involving percentage change • solve **some** problems involving direct proportion • use compound units such as speed and density to solve problems.	know the criteria for congruency of triangles • derive and illustrate properties of triangles, quadrilaterals, circles and other geometrical figures with appropriate language. • be able to recognise transformations such as translation, reflection rotation and be able to recognise and describe them **with some** understanding • Be able to construct similar shapes using **basic understanding** of enlargement and describe enlargements • apply the properties of angles at a point, angles on a straight line and vertically opposite angles • Understand the **basic** relationships with angles in parallel lines such as corresponding and alternate angles • Derive the sum of angles in a triangle using **basic knowledge** • Be able to use **basic understanding** of pythagoras' theorem with	• Describe, interpret and compare the mean, mode, median and range (considering outliers) • With **some understanding** construct and interpret frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data • Describe **basic** mathematical relationships between two variables using scatter graphs.