KS3 'Stages of Excellence': Maths

	Year 7	Year 8	Year 9
4.Extending	• ALGEBRA ○ Simplify algebraic fractions, using factorising and cancelling. ○ Solve complex algebrac equations, with unknowns on both sides • GEOMETRY AND MEASURE ○ Calculate and interpret gradients and intercepts of graphs of linear equations of the form y = mx +c. ○ Develop methods for effective problem solving. • NUMBER ○ Write decimals in the form A x 10^n. ○ Write negative powers of ten. ○ Write positive integers in the form A x 10^n. • RATIO AND PROPORTION ○ Apply basic addition and subtraction methods. ○ Recognise and perform calculations using powers of 10. • PROBABILITY AND STATISTICS ○ Input data into a frequency table. ○ Solve problems involving averages and range. ○ Use systematic listing to display outcomes of a set.	• ALGEBRA ○ Rearrange an expression to find different unknowns involving powers. ○ Understand powers and laws of indices in complex equations. ○ Change the subject of a complex formula. • GEOMETRY AND MEASURE ○ Understand the properties of similar shapes. ○ Convert volume units. ○ Identify the different types of angles formed by parallel lines and a transversal. ○ Calculate the surface area and volume of 3D solids. • NUMBER ○ Select appropriate method for calculations involving fractions. ○ Use rounding to estimate a solution. ○ Recognise what is meant by prime factorisation and justify an appropriate method to determine the HCF and LCM. ○ Calculate simple percentage increase and decrease problems. ○ Calculate percentage increase and decrease problems. ○ Understand and apply a multiplier. • RATIO AND PROPORTION ○ Perform calculations involving ratio. ○ Understand the relationship between variables which are directly or inversely proportional. ○ Understand the relationship between variables which are directly proportional. • PROBABILITY AND STATISTICS ○ Understand the relationship between relative frequency and theoretical probability. ○ Interpret and compare frequency diagrams. ○ Understand what is meant by union and intersection of a Venn Diagram.	• ALGEBRA ○ Change the subject of a complex formula. ○ Solve a pair of simultaneous equations graphically. ○ Develop reasoning methods for effective problem solving. ○ Approximate solutions to algebraic equations using graphs. ○ Work out gradients of perpendicular lines. ○ Explore proofs of Pythagoras theorem. ○ Use Pythagoras theorem in 3-d shapes. ○ Understand graphical solutions to simultaneous equations. • GEOMETRY AND MEASURE ○ Work out the volumes of cones, spheres and complex shapes. ○ Work out the surface area of any prism. ○ Enlarge shapes by negative scale factors. ○ Develop an understanding of the trigonometric ratios. ○ Accurately describe and draw enlargement using a fractional scale factor. • NUMBER ○ Work out repeated percentage change ○ Understand percentage change with and without a calculator. ○ Calculate percentage increase and decrease problems. ○ Understand and apply a multiplier. • RATIO AND PROPORTION ○ Justify appropriate methods using reasoning skills. ○ -Use mathematical methods in real life problems (best buys, worded ratio). • PROBABILITY AND STATISTICS ○ Construct a tree diagram to solve probability problems. ○ Understand set notation. ○ Construct a tree diagram to solve probability problems. ○ Understand set notation.
3.Secure	• ALGEBRA ○ Use multiplicative methods to expand double brackets. ○ Form and solve linear inequalities ○ Identify key features of a linear graphs including gradient and y-intercept. • GEOMETRY AND MEASURE ○ Measure angles and lengths accurately. ○ Convert metric units of length. ○ Understand what is meant my parallel. ○ Calculate the areas of basic and compound shapes.	• ALGEBRA ○ Recognise and use notation for powers and roots. ○ Use knowledge of powers and roots to estimate and solve. ○ Use multiplicative methods to expand double brackets. ○ Form and solve linear inequalities ○ Identify key features of a linear graphs including gradient and y-intercept. • GEOMETRY AND MEASURE ○ Convert area units. ○ -Calculate the area complex 2D shapes including, of trapezia, parallelograms and circles.	• ALGEBRA ○ Recognise the nth term for non-linear sequences including quadratic sequences. ○ Factorise quadratics for x 2 coefficients equal to one. ○ Describe the nth term for a sequence. ○ Solve one step algebraic calculations using bar models. ○ Form basic algebraic expressions. • GEOMETRY AND MEASURE ○ Convert volume units ○ Develop an understanding of the trigonometric ratios. ○ Accurately describe and draw enlargement using a fractional scale factor.

	○ Find the order of rotational symmetry for regular shapes. • NUMBER ○ Recognise what is meant by prime factorisation and justify an appropriate method to determine the HCF and LCM. ○ Calculate simple percentage increase and decrease problems. • RATIO AND PROPORTION ○ Understand and Recognise ratio notation ○ Use multiplicative reasoning when performing calculations involving fractions and taios. • PROBABILITY AND STATISTICS ○ Input data into a frequency table. ○ Solve problems involving averages and range. ○ Use systematic listing to display outcomes of a set.	○ Calculate the surface area and volume of 3D solids. • NUMBER ○ Calculate percentage increase and decrease problems. ○ Understand and apply a multiplier. ○ Understand the relationship between variables which are directly proportional. • RATIO AND PROPORTION ○ Perform more complex calculations involving two part and three-part ratios. ○ Use multiplicative reasoning to scale values (developing bar models). • PROBABILITY AND STATISTICS ○ Describe correlation from a scatter graph. ○ Understand the relationship between relative frequency and theoretical probability.	○ Work out the surface area of any prism. • NUMBER ○ Work out repeated percentage change. ○ Understand percentage multipliers. ○ Understand and apply a multiplier effectively. ○ Recognise and calculate reverse percentages. ○ Understand the relationship between variables which are directly or inversely proportional. • RATIO AND PROPORTION ○ Understand the relationship between variables which are directly or inversely proportional. ○ Use multiplicative reasoning to scale values (developing bar models). • PROBABILITY AND STATISTICS ○ Understand the relationship between relative frequency and theoretical probability. ○ Draw an accurate frequency diagram. ○ Calculate the estimate mean from a grouped frequency table. ○ Understand what is meant by union and intersection of a Venn Diagram.
2.Developing	• ALGEBRA ○ Use multiplicative methods to expand double brackets. ○ Form and solve linear inequalities ○ Identify key features of a linear graphs including gradient and y-intercept. • GEOMETRY AND MEASURE ○ Measure angles and lengths accurately. ○ Convert metric units of length. ○ Calculate the perimeter of basic and compound shapes. ○ Recognise shapes which tessellates. • NUMBER ○ Recognise and use number bonds to ten. ○ Recall and use times tables effectively. ○ Identify factors and multiples of a number. ○ • RATIO AND PROPORTION ○ Compare two amounts using a bar models (ratio). ○ Express amounts in ratio form. ○ Recognise notation for powers and roots. • PROBABILITY AND STATISTICS ○ Construct and interpret a tally charts. ○ Read and understand bar charts and pictograms. ○ Interpret dual and composite bar charts.	• ALGEBRA ○ Recognise the nth term for non-linear sequences including quadratic sequences. ○ Factorise quadratics for x 2 coefficients equal to one. • GEOMETRY AND MEASURE ○ Understand what is meant my parallel. ○ Calculate the areas of basic and compound shapes. ○ Find the order of rotational symmetry for regular shapes. ○ Identify the different types of angles formed by parallel lines and a transversal. ○ Recognise nets of 3D shapes. ○ Draw plans and elevations of a given solid. • NUMBER ○ Recognise and use notation for powers and roots. ○ Evaluate and explain complex fraction calculations including mixed numbers. ○ Select appropriate method for calculations involving fractions. ○ Use rounding to estimate a solution. • RATIO AND PROPORTION ○ Perform calculations involving ratio. ○ Understand the relationship between variables which are directly proportional. ○ Perform more complex calculations involving two part and three-part ratios. • PROBABILITY AND STATISTICS ○ Know the difference between discrete and continuous data. ○ Understand what is meant my bias/unbiased data. ○ Input data into a frequency table.	• ALGEBRA ○ Rearrange an expression to find different unknowns including SDT. ○ Solve one and two step equations. • GEOMETRY AND MEASURE ○ Measure angles and lengths accurately. ○ Convert metric units of length. ○ Calculate the perimeter of compound shapes. ○ Understand what is meant my parallel. ○ Calculate the areas of basic and compound shapes. ○ Find the order of rotational symmetry for regular shapes. ○ Accurately describe and draw a reflection transformation. • NUMBER ○ Identify factors and multiples of a number. ○ Select and apply appropriate addition and subtraction methods. ○ Understand and compare fractions including equivalence of fractions, decimals and percentages. ○ Evaluate basic fraction calculations • RATIO AND PROPORTION ○ Perform calculations involving ratio. ○ Understand the relationship between variables which are directly or inversely proportional. • PROBABILITY AND STATISTICS ○ Construct a tree diagram to solve probability problems. ○ Understand set notation. ○ Interpret and compare frequency diagrams. ○ Understand the relationship between relative frequency and theoretical probability. ○ Draw an accurate frequency diagram.

1.Novice	• ALGEBRA ○ Recognise co-ordinates in 1st quadrant. ○ Recognise and continue a sequence. ○ Solve one step algebraic calculations using function machines. ○ Represent unknowns pictorially. • GEOMETRY AND MEASURE ○ Recognise and name 2D shapes correctly. ○ Understand basic angle rules for straight lines and around points. • NUMBER ○ Recognise and use number bonds to ten. - Recall and use times tables effectively. ○ Read and write whole numbers and decimals in figures and words. ○ Understand and use place value correctly. ○ Recognise and perform calculations using powers of 10 • RATIO AND PROPORTION ○ Understand directed numbers ○ Compare two amounts using a bar models (ratio). ○ Understand steps to share a ratio. • PROBABILITY AND STATISTICS ○ Understand probability facts, unlikely, certain, etc. ○ Recognise and perform calculations using powers of 10.	• ALGEBRA ○ Understand how to collect like terms ○ Solve two step algebraic calculations using function machines. ○ Recognise term-to-term rules for a sequence. ○ Simplify basic algebraic expressions. • GEOMETRY AND MEASURE ○ Recognise and name 3D shapes correctly. ○ Find lines of symmetry for basic 2D shapes. ○ Recognise shapes which tessellates. • NUMBER ○ Evaluate more complex fraction calculations including mixed numbers ○ Calculate fractions of an amount. ○ Use multiplicative reasoning when performing calculations involving fractions. ○ Use knowledge of percentages to compare two quantities. • RATIO AND PROPORTION ○ Complete calculations involving directed numbers ○ Express amounts in ratio form. ○ Perform calculations involving ratio. • PROBABILITY AND STATISTICS ○ Input data into a frequency table. ○ Solve problems involving averages and range. ○ Use systematic listing to display outcomes of a set.	• ALGEBRA ○ Multiply out brackets, identify and take out common factors to factorise. ○ Substitute numerical values into expressions. ○ Describe the nth term for a sequence. ○ Solve one step algebraic calculations using bar models. ○ Form basic algebraic expressions. • GEOMETRY AND MEASURE ○ Measure angles and lengths accurately. ○ Convert metric units of length. ○ Calculate the perimeter of compound shapes. ○ Understand what is meant my parallel. ○ Calculate the areas of basic and compound shapes. ○ Find the order of rotational symmetry for regular shapes. ○ Accurately describe and draw a reflection transformation. • NUMBER ○ Evaluate and explain complex fraction calculations including mixed numbers. ○ Select appropriate method for calculations involving fractions. ○ Use rounding to estimate a solution. • RATIO AND PROPORTION ○ Describe correlation from a scatter graph. ○ Understand the relationship between relative frequency and theoretical probability. ○ Draw an accurate frequency diagram. • PROBABILITY AND STATISTICS ○ Construct a pie chart. ○ Understand what is meant my bias/unbiased data. ○ Know the difference between discrete and continuous data.