Year 9 Syllabus in a nutshell

MATHS

Year 9 Syllabus in a nutshell – Maths

Note that due to the setting in year 9 your child may find that not all aspects of each topic have been completed. This is to allow for your child to make individual progress through each topic area at the level appropriate to them. The aim of all students in Year 9 is to consolidate understanding of the Foundation Level material. Excellent achievement of these Foundation topics at this stage would suggest progression to a Grade 7 by the end of Year 11.

Topic	iGCSE Reference – Taken directly from specification	Summary of Content
Calculating	FOUNDATION: 1.4 C – use index notation and index laws for multiplication and division of positive and negative integer powers including zero 1.9 A – calculate with and interpret numbers in the form $a \times 10^n$, where $1 \le a < 10$ and n is an integer 1.11 A – use a scientific electronic calculator to determine numerical results HIGHER: 1.9 A - solve problems involving standard form	Understand the concept of very large and very small numbers, using standard form notation to write such numbers. Know and can apply Index laws to simplify algebraic expressions. Be able to use a calculator to determine the solution to a problem – including interpretation of a word problem.
Algebraic Proficiency: Tinkering	FOUNDATION: 2.2 E – expand the product of two simple linear expressions 2.2 F – understand the concept of a quadratic expression and be able to factorise such expressions (limited to $x^2 + bx + c$) 2.3 D – use formulae from mathematics and other real-life contexts expressed initially in words or diagrammatic form and convert to letters and symbols 2.3 E – derive a formula or expression HIGHER: 2.2 A – expand the product of two or more linear expressions 2.2 B – understand the concept of a quadratic expression and be able to factorise such expressions 2.2 C – manipulate algebraic fractions where the numerator and/or the denominator can be numeric, linear or quadratic 2.2 E – use algebra to support and construct proofs	Develop understanding in manipulating algebraic expression – to include simplifying expressions, expanding brackets by a single term and expanding double brackets, factorise simple expressions by taking out common factors and also factorise simple quadratic expressions. Make use of algebraic manipulation in word problems and geometric problems.
Proportional Reasoning	FOUNDATION: 1.7 B - divide a quantity in a given ratio or ratios 1.7 D – calculate an unknown quantity from quantities that vary in direct proportion 1.7 E – solve word problems about ratio and proportion 4.2 F – understand congruence as meaning the same shape and size	Understand the ideas of direct and indirect proportion and understand how to calculate new quantities in such

	4.2 G – understand that two or more polygons with the same shape and size are said to be congruent to each other 4.4 F – understand and use the relationship between average speed, distance and time 4.4 G – use compound measures such as speed, density and pressure 4.11 A – understand and use the geometrical properties that similar figures have corresponding lengths in the same ratio but corresponding angles remain unchanged 4.11 B – use and interpret maps and scale drawings	problems. Recognise proportion in shapes and the associated language (congruence and similar shapes). Have knowledge of compound measures such as speed, density and pressure and how to apply the formulae in calculations. Understand and interpret map scales and scale drawings.
Investigating properties of shapes (Top Set only)	FOUNDATION: 4.8 B – know, understand and use sine, cosine and tangent of acute angles to determine lengths and angles of a right-angled triangle 4.8 C – apply trigonometrical methods to solve problems in 2D	Know and apply the trigonometric ratios – sine, cosine and tangent of acute angles in right-angled triangles to find unknown lengths and angles in 2D
Pattern Sniffing	FOUNDATION: 3.1 A – generate terms of a sequence using term-to-term and position-to-term definitions of the sequence 3.1 B – find subsequent terms of an integer sequence and the rule for generating it 3.1 C – use linear expressions to describe the nth term of arithmetic sequences HIGHER: 3.1 A – understand and use common difference (d) and first term (a) in an arithmetic sequence 3.1 B – know and use nth term $= a + (n-1)d$ 3.1 C – find the sum of the first n terms of an arithmetic series (Sn)	Generate a sequence given either a term-to-term rule (such as add 4 to each term) or a position-to-term rule (such as nth term = 3n + 1). Describe linear sequences using words and find the nth term of a linear (arithmetic) sequence. Formalise an arithmetic sequence finding the general term and the sum of terms in an arithmetic sequence.
Exploring Fractions, Decimals and Percentages	FOUNDATION: 1.6 B – Express a given number as a percentage of another number 1.6 C – express a percentage as a fraction and as a decimal 1.6 D – Understand the multiplicative nature of percentages as operators 1.6 E – Solve simple percentage problems, including percentage increase and decrease 1.6 F – use reverse percentages 1.6 G – use compound interest and depreciation HIGHER: 1.6 A – use repeated percentage change 1.6 B – solve compound interest problems	Be able to manipulate numbers between fractions, decimals and percentages. Calculate percentages of quantities and solve percentage increase/decrease problems. Find original quantities after a percentage increase/decrease (i.e. reverse percentages) and solve repeated percentage change

		problems, to include compound interest problems.
Solving Equations and Inequalities I	FOUNDATION: 2.8 B – understand and use the convention for open and closed intervals on a number line 2.8 C – solve simple linear inequalities in one variable and represent the solution set on a number line	Understand and interpret expressions written as an inequality. Solve simple linear inequalities and be able to express a solution on a number line
Calculating Space: Areas	FOUNDATION: 4.8 A – know, understand and use Pythagoras' theorem in 2D 4.10 C – find the surface area of simple shapes using the area formulae for triangles and rectangles 4.10 D – find the surface area of a cylinder 4.10 E – find the volume of prisms, including cuboids and cylinders, using an appropriate formula 4.10 F – convert between units of volume within the metric system HIGHER: 4.10 A – find the surface area and volume of a sphere and a right circular cone using relevant formulae	Know and apply Pythagoras' Theorem in 2D problems. Find the surface area of 3D shapes – cylinder, prisms etc. and volumes of 3D spaces – cuboids, cylinders, prisms etc. (NB. Areas of 2D shapes is expected – Triangles, rectangles, circles, squares, parallelograms, trapeziums). Convert between units including conversion between area units and volume units. Know and calculate the surface area and volume of a sphere and a right circular cone
Conjecturing	FOUNDATION: 4.2 A – recognise and give the names of polygons 4.2 B understand and use the term 'quadrilateral' and the angle sum property of quadrilaterals 4.2 D – understand the term 'regular polygon' and calculate interior and exterior angles of regular polygons 4.2 E – understand and use the angle sum of polygons 4.7 A – give informal reasons, where required, when arriving at numerical solutions to geometrical problems HIGHER: 4.6 A – understand and use the internal and external intersecting chord properties 4.6 B – recognise the term 'cyclic quadrilateral' 4.6 C – understand and use angle properties of the circle including:	Have knowledge of the language associated with polygons – triangles, quadrilaterals, pentagons, hexagons etc. Have knowledge of the properties of the common polygons – including regular shapes such as equilateral triangles and squares. Know the angle sum of polygons and how to calculate the interior and exterior angles of a

	(i) angle subtended by an arc at the centre of a circle is twice the angle subtended at any point on the remaining part of the circumference (ii) angle subtended at the circumference by a diameter is a right angle (iii) angles in the same segment are equal (iv) the sum of the opposite angles of a cyclic quadrilateral is 180⁰ (v) the alternate segment theorem 4.7 A – provide reasons, using standard geometrical statements, to support numerical values for angles obtained in any geometrical context involving lines, polygons and circles	polygon. Have knowledge of parallel line facts and related angle properties – corresponding angles, vertically opposite angles and alternate angles. Have knowledge of the language associated with a circle and the related circle theorems with exposure to the proofs of these theorems.
Algebraic Proficiency: Visualising	FOUNDATION: 3.3. E – determine the coordinates of points identified by geometrical information 3.3 G – find the gradient of a straight line 3.3 H – recognise that equations of the form $y = mx + c$ are straight line graphs with gradient m and intercept on the y-axis at the point (o, c) 3.3 I – recognise, generate points and plot graphs of linear and quadratic functions HIGHER: 3.3 F – calculate the gradient of a straight line given the coordinates of two points 3.3 G – find the equation of a straight line parallel to a given line; find the equation of a straight line perpendicular to a given line	Recognise and interpret the equations of a straight line. Be able to calculate the gradient of a straight line and find the mid-point between two points. Generate points in a table of values to draw a straight line or a quadratic function. Given the equation of a straight line find another line either parallel or perpendicular to it.
Solving Equations and Inequalities II	FOUNDATION: 2.6 A – calculate the exact solution of two simultaneous equations in two unknowns HIGHER: 2.6 A – calculate the exact solution of two simultaneous equations in two unknowns 2.6 B – Interpret the equations as lines and the common solution as the point of intersection	Find the solution to a pair of simultaneous equations. Recognise that the solution to a pair of simultaneous equations is also the point of intersection between two lines.
Presentation of Data	FOUNDATION: 6.1 A – use different methods of presenting data 6.1 B – use appropriate methods of tabulation to enable the construction of statistical diagrams 6.1 C – interpret statistical diagrams	Use different methods of presenting data – to include tables and charts. Be able to interpret and discuss data when represented in different formats.
Understanding Risk	FOUNDATION: 6.3 A – understand the language of probability 6.3 B – understand and use the probability scale 6.3 C – understand and use estimates or measures of probability from theoretical models	Understand the language associated with probability. Use experimentation to

	6.3 E – understand the concepts of a sample space and an event, and how the probability of an event happening can be determined from the sample space 6.3 F – list all the outcomes for single events and for two successive events in a systematic way 6.3 G – estimate probabilities from previously collected data 6.3 H – calculate the probability of the complement of an event happening 6.3 I – use the addition rule of probability for mutually exclusive events 6.3 J – understand and use the term 'expected frequency' HIGHER: 6.3 A – draw and use tree diagrams 6.3 B – determine the probability that two or more independent events will occur 6.3 C – use simple conditional probability when combining events 6.3 D – apply probability to simple problems	estimate a probability or use theoretical models to calculate a probability. List all the outcomes of a single event or for two successive events. Use the addition rule for mutually exclusive events and understand and use the term 'expected frequency'. Draw and use tree diagrams, determining the probability of two events and applying probability to simple problems.
Algebraic Tinkering	FOUNDATION: 2.3 C – Substitute positive and negative integers, decimals and fractions for words and letters in expressions and formulae 2.3 F – Change the subject of a formula where the subject appears once HIGHER: 2.3 A – understand the process of manipulating formulae or equations to change the subject, to include cases where the subject may appear twice or a power of the subject occurs 3.2 A – understand the concept that a function is a mapping between elements of two sets 3.2 B – use function notations of the form $f(x) = ….$ and mapping notation 3.3 C – understand the terms 'domain' and 'range' and which values may need to be excluded from a domain 3.3 D - understand and find the composite function fg and the inverse function f^{-1}	Substitute numbers into expressions and formulae. Change the subject of a formula where the term appears once, or twice. Understand the concept of a function as a mapping and use the correct function notation. Understand the terms domain and range in relation to functions and know how to find the composite function and the inverse function.
Mathematical Movement: Transformations	FOUNDATION: 5.2 A – Understand that rotations are specified by a centre and an angle 5.2 B – rotate a shape about a point through a given angle 5.2 C – Recognise that an anti-clockwise rotation is a *positive* angle of rotation and a clockwise rotations is a *negative* angle of rotation 5.2 D – Understand that reflections are specified by a mirror line 5.2 E – construct a mirror line given an object and reflect a shape given a mirror line 5.2 F – understand that translations are specified by a distance and direction 5.2 G – Translate a shape 5.2 H – understand and use column vectors in translations	Recognise and spot shapes that have been rotated, reflected, translated or enlarged. Compute transformations – rotations, reflections, translations and enlargements. Use correct language to describe each of the transformations.

	5.2 I – understand that rotations, reflections and translations preserve length and angle so that a transformed shape under any of these transformations remains congruent to the original shape 5.2 J – understand that enlargements are specified by a centre and a scale factor 5.2 K – understand that enlargements preserve angles and not lengths 5.2 L – enlarge a shape given the scale factor 5.2 M – identify and give complete descriptions of transformations	