TAUNTON SCHOOL

Year 10 Syllabus in a nutshell

MATHS

Year 10 Syllabus in a nutshell – Maths

Note that due to the setting in year 10 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 10 is to ensure that Foundation Level Material is secure and commence understanding of the Higher Level Material. At the start of year 11, students will be assessed on the progress they are making through the course and should it be appropriate we may suggest that students focus on the Foundation Level to ensure they maximise their potential.

The top set have completed the iGCSE course and have started working towards the Additional Maths qualification. It is therefore expected that they are familiar with the whole iGCSE course (https://qualifications.pearson.com/content/dam/pdf/International%20GCSE/Mathematics%20A/2016/Specification%20and%20sample%20assessments/International-GCSE-in-Mathematics-Spec-A.pdf)

They should use this specification and the separate table at the bottom of this document to review the work they have completed this year.

Topic	iGCSE Reference – taken from the specification	Summary
Investigating properties of shapes	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
Calculating Indices	FOUNDATION: 1.4 C – use index notation and index laws for multiplication and division of positive and negative integer powers including zero HIGHER: 2.1 A – use index notation involving fractional, negative and zero powers	Know and can apply Index laws to simplify algebraic expressions, to include negative and fractional powers
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	Substitute numbers into expressions and formulae. Change the subject of a formula where the term appears once, or twice.
Calculating	FOUNDATION: 1.8 B – round to a given number of significant figures or decimal places 1.8 C – identify upper and lower bounds where values are given to a degree of accuracy 1.8 D – use estimation to evaluate approximations to numerical calculations 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 HIGHER: 1.8 A – solve problems using upper and lower bounds where values are given to a degree of accuracy	Know how to round a number to a given degree of accuracy. Be able to calculate upper and lower bounds and use such estimations in calculations, to include calculating speed, density and pressure.
Proportional Reasoning	HIGHER: 2.5 A – set up problems involving direct or inverse proportion and relate algebraic solutions to graphical representation of the equations	Set up and solve problems relating to direct or inverse proportion and recognise a

		graphical representation of these
Pattern Sniffing	HIGHER: 3.1 A – understand and use common difference (*d*) and first term (*a*) in an arithmetic sequence 3.1 B – know and use *n*th term = $a + (n-1)d$ 3.1 C – find the sum of the first *n* terms of an arithmetic series (Sn)	Formalise an arithmetic sequence finding the general term and the sum of terms in an arithmetic sequence.
Solving Equations and Inequalities II	FOUNDATION: 2.8 D – represent simple linear inequalities on rectangular Cartesian graphs 2.8 E – identify regions on rectangular Cartesian graphs defined by simple linear inequalities HIGHER: 2.8 B – identify harder examples of regions defined by linear inequalities	Illustrate linear inequalities on a graph and identify regions that satisfy inequalities
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 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	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.
Calculating Space	FOUNDATION: 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 4.11 A – understand that areas of similar figures are in the ratio of the square of corresponding sides 4.11 B – understand that volumes of similar figures are in the ratio of the cube of corresponding sides 4.11 C – use areas and volumes of similar figures in solving 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. Recognise similar shapes and find areas and volumes of similar shapes using the idea of a scale factor.
Conjecturing	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: (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 180^{o} (v) the alternate segment theorem	Have knowledge of the language associated with a circle and the related circle theorems with exposure to the proofs of these theorems.

	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	
Algebraic Proficiency: Visualising	HIGHER: 3.3 A – recognise, plot and draw graphs with equation: $y = Ax^3 + Bx^2 + Cx + D$ in which: (i) the constants are integers, and some could be zero (ii) the letters x and y can be replaced with any other two letters or: $y = Ax^3 + Bx^2 + Cx + D + E/x + F/x^2$ in which: i. the constants are numerical and at least three of them are zero ii. the letters x and y can be replaced with any other two letters or: y = sin x, y = cos x, y = tan x for angles of any size (in degrees) 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	Generate points in a table of values to plot curves. Calculate the gradient of a straight line and given the equation of a straight line find a parallel or perpendicular line.
Exploring Fractions, Decimals and Percentages	FOUNDATION: 1.6 F – use reverse percentages 1.6 G – use compound interest and depreciation HIGHER: 1.3 A – convert recurring decimals into fractions 1.6 A – use repeated percentage change 1.6 B – solve compound interest problems	Find original quantities after a percentage increase/decrease (i.e. reverse percentages) and solve repeated percentage change problems, to include compound interest problems. Convert recurring decimals to fractions.
Understanding Risk I	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 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'	Understand the language associated with probability. Use experimentation to 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'.
Solving Equations and Inequalities III	FOUNDATION: 2.7 A – solve quadratic equations by factorisation (limited to $x^2+bx+c=0$) HIGHER: 2.7 A – solve quadratic equations by factorisation	Solve quadratic equations using factorisation
Understanding Risk II	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	Draw and use tree diagrams, determining the probability of two events and applying probability to simple problems.
Mathematical Movement II	HIGHER: 5.1 A – understand that a vector has both magnitude and direction 5.1 B – understand and use vector notation including column vectors 5.1 C – multiply vectors by scalar quantities 5.1 D – add and subtract vectors	Understand and interpret a vector as having both magnitude and direction. Know how to manipulate vectors using addition, subtraction and

		multiplication by a scalar quantity.
Investigating properties of shapes	HIGHER: 4.8 A – understand and use sine, cosine and tangent of obtuse angles 4.8 B – understand and use angles of elevation and depression 4.8 C – understand and use the sine and cosine rules for any triangle 4.8 D – use Pythagoras' theorem in three dimensions 4.8 E – understand and use the formula 12absinC for the area of a triangle 4.8 F – apply trigonometrical methods to solve problems in three dimensions, including finding the angle between a line and a plane	Apply sine, cosine and tangent ratios to angles greater than 90. Understand and use angles of elevation and depression. Use the sine and cosine rule for any triangle. Apply Pythagoras' theorem and trigonometry in 3D and use the area of a triangle formulae = ½ ab sinC

Top Set only (TW Class)

Topic	**Add Maths Reference – taken directly from the specification**	**Summary**
Algebraic Manipulation (Section 1)	AL1 Know and use algebraic vocabulary and notation. AL2 Simplify expressions involving algebraic fractions and square roots. AL3 Perform operations with polynomials, including addition, subtraction, multiplication and division. AL4 Find linear factors of a polynomial. AL5 Complete the square of a quadratic polynomial.	Be able to manipulate algebraic expressions including fractions, find factors of polynomials and manipulate quadratic expressions
Applications of Equations (Section 1)	AL6 Set up and solve problems leading to linear, quadratic and cubic equations in one unknown, and to simultaneous equations in two unknowns.	Set up and solve equations, to include simultaneous equations in two unknowns
Coordinate Geometry (Section 2)	CG1 Calculate the distance between two points. CG2 Find the mid-point of a line segment.	Find the distance of a line segment and it's mid-point
The coordinate geometry of circles (Section 2)	CG3 Know and use the equation of a circle $(x-a)^2+(y-b)^2=r^2$, where (a,b) is the centre and r is the radius of the circle	Interpret and deduce the Equation of a circle
Ratios of any angles (Section 3)	PT1 Use the definitions of sin x, cos x and tan x for any angle and their graphs. PT2 Know the sine and cosine rules and be able to apply them, including the ambiguous case for sine.	Knowledge of trigonometric ratios for any angle and their related graphs. Apply the Sine and cosine rule to find unknown lengths or angles in triangles
Trigonometric Identities (Section 3)	PT3 Know and use the identity $\tan x \equiv \frac{\sin x}{\cos x}$ PT4 Know and use the identity $\sin^2 x + \cos^2 x \equiv 1$	Use identities to solve equations
Trigonometric equations (Section 3)	PT5 Solve simple trigonometric equations in given intervals	Solve trigonometric equations
Applications in modelling (Section 3)	PT6 Apply Pythagoras' Theorem and trigonometry to 2- and 3-dimensional problems.	Use Pythagoras' Theorem and trigonometry in both 2D and 3D situations
Differentiation (Section 6)	CA1 Differentiate kx^n where n is a positive integer or 0, and the sum of such functions. CA2 Know that the gradient function gives the gradient of the curve and measures the rate of change of y with x . CA3 Know that the gradient of the function is the gradient of the tangent at that point.	Differentiate a polynomial and recognise that this is the gradient function. Find the gradient of a tangent and the related equation of the tangent or the equation of

	CA4 Find the equation of a tangent and normal at any point on a curve. CA5 Use differentiation to find stationary points on a curve. CA6 Determine the nature of a stationary point. CA7 Sketch a curve with known stationary points.	the normal. Use differentiation to find stationary points and determine its nature. Sketch curves using the additional information provided from differentiation.
Integration (Section 6)	CA8 Integrate kx^n where n is a positive integer or 0, and the sum of such functions. CA9 Be aware that integration is the reverse of differentiation. CA10 Know what is meant by an indefinite and a definite integral. CA11 Evaluate definite integrals. CA12 Find the area between a curve, two ordinates and the x-axis. CA13 Find the area between two curves.	Integrate a polynomial and find indefinite and definite integrals. Find the area under a curve, or between two curves.
Application to kinematics (Section 6)	CA14 Use differentiation and integration with respect to time to solve simple problems involving variable acceleration. CA15 Recognise the special case where the use of constant acceleration formulae is appropriate.	Use differentiation and integration in problems involved displacement, velocity and acceleration