MATHEMATICS HIGHER TIER

Year 11

What are the aims and intentions of this curriculum?

The aim of the curriculum is to consolidate and extend students' knowledge on what they did in KS3. It is the aim of the curriculum to develop students' problem solving and reasoning skills in the areas of: Numbers, algebra, ratio, proportion and rate of change, geometry, measurement, probability and statistics. Students will ultimately be ready to sit the Higher GCSE examination at the end of this program of study. Our vision is for students to ultimately be able to mathematical analyse situations, critically evaluate problems and to deduce plausible accurate solutions. Furthermore, they should be proficient enough in order to access professions and trainings at the highest level. To provide students with a holistic experience, prepare them for future success, help them aspire and value mathematics, Personal Social Health and Economic (PSHE) education and Careers Education (CE) are incorporated into the curriculum.

Term	Topics	Knowledge and key terms	Skills developed	Assessment
Autumn 1	*Vectors and geometric proof*	Vector, magnitude, resultant, parallel, collinear, geometric proof	In this lesson students will learn about vector and vector notations. They will learn to work out the magnitude of a vector, perform calculations using vectors and represent the solutions graphically. Students will learn to prove that lines are parallel and that points are collinear. They will solve geometric problems in two dimensions using vector methods and apply vector methods for simple geometric proofs. CE: Biological analyst, transport and energy, applied research, adjunct instructor, quantitative analyst PSHE: Vectors are used to promote wellbeing by giving students a measurement to compare their physical and emotional health.	Piximaths Aiming for grade 7-9 booklet MyMaths: https://vle.mathswatch.co.uk/vle/ End of topic class test Stretch and challenge feedback sheet (fortnightly)
Autumn 2	*Proportion and graphs*	Equations, direct proportion, cubic, square, inverse, gradient, exponential function, tangent, non- linear, translate, curve, reflect	In this topic students will learn to write and use equations to solve problems involving direct and inverse proportion. Solve problems involving square and cubic proportionality. Students will also learn to recognize graphs of different functions. We will also look at how to calculate the gradient of a tangent at a point, estimate the area under a non-linear graph and understand the relationship between translating a graph and the change in its function notation. CE: Table games dealer, carpenter, production supervisor, account specialist, wind technician, custodian PSHE: Hygiene is promoted by representing tooth decay vs care as a gradient.	Piximaths Aiming for grade 7-9 booklet MyMaths: https://vle.mathswatch.co.uk/vle/ End of topic class test Stretch and challenge feedback sheet (fortnightly)

Spring 1	Similarity and congruence	Congruent, ratio, scale factor, similar, corresponding, length, volume, upper bound, lower bound	In this topic students will explore similarity and congruence. Students will recall how to show that two triangles are congruent and prove shapes are congruent. Students will also use the ratio of corresponding sides to work out scale factors and find missing lengths on similar shapes. Use the link between linear scale factor and area scale factor to solve problems. And use the link between scale factors for length, area and volume to solve problems. CE: Baker, computer programmer, concrete mason, conservation scientist, construction manager	Piximaths Aiming for grade 7-9 booklet MyMaths: https://vle.mathswatch.co.uk/vle/ End of topic class test Stretch and challenge feedback sheet (fortnightly)
	More trigonometry	sine, cosine, tangent, segment, bearings, Pythagoras theorem	In this topic students will recall how to use upper and lower bounds in calculations involving trigonometry. Recall how to find the sine and cosine of any angle and know the graph of the sine and cosine function and use it to solve equations. Know the graph of the cosine function and use it to solve equations. We will also look at how to find the tangent of any angle. Students will also learn to use Pythagoras theorem, sine rule and cosine rule to solve 2D and 3D problems. Recognise how changes in a function affect trigonometric graphs. CE: Game developer, construction, flight engineering, archeologist, physicist PSHE: The use of trigonometric waves is linked to REM sleep to promote the importance of good rest on health and concentration.	
Spring 2	Further statistics	Sample, random, stratified sample, cumulative frequency, median, quartile, interquartile, stem-and-leaf, histogram, box plot	In this topic students will understand how to take a simple random sample, how to take a stratified sample, learn to draw and interpret cumulative frequency tables and diagrams, work out the median, quartiles and interquartile range from a cumulative frequency diagram, find the quartiles and the interquartile range from stem-and-leaf diagrams, draw and interpret box plots, understand frequency density, draw histograms, interpret histograms and compare two sets of data. CE: Quantitative analyst, research analyst, royalty calculations analyst, statistician	Piximaths Aiming for grade 7-9 booklet MyMaths: https://vle.mathswatch.co.uk/vle/ End of topic class test Stretch and challenge feedback sheet (fortnightly)

		Circle Theorem	Circle, tangent, cyclic, point, angle, subtended, circumference, centre	In this topic students will solve problems involving angles, triangles and circles. Students will explore the circle theorems. Students will understand and use facts about chords and their distance from the centre of a circle, solve problems involving chords and radii, understand and use facts about tangents at a point and from a point. Give reasons for angle and length calculations involving tangents, prove and use facts about angles subtended at the centre and the circumference of circles. The students will solve angle problems using circle theorems, give reasons for angle sizes using mathematical language and find the equation of the tangent to a circle at a given point. CE: Optometrist, aerospace engineer, aircraft mechanic, astronomer, physicist PSHE: In statistics, students link the causality between harmful substances and their risks to raise awareness of substance abuse.	