The Sutton Academy

Knowledge Rich Curriculum Plan

Year 12 Maths

Unit 11 – Vectors

Maths Year 12	Unit: Vectors			
Lesson/Learning Sequence	**Intended Knowledge:** *Students will know that…*	**Tiered Vocabulary**	**Prior Knowledge:** *In order to know this students, need to already know that…*	**Assessment**
Lesson 54: Vectors Lesson Objective: To learn how to use vectors in two dimensions.	• Students will know that a vector has both magnitude (length) and direction. • Students will know how to represent a vector using a directed line segment. • Students will know that if two vectors are equal then the line segments are equal in length and parallel. • Students will know that the negative version of the vector represents the same line segment but in the opposite direction. • Students will know how to use the triangle law for vector addition. • Students will know that the resultant is the vector sum of two or more vectors. • Students will know how to illustrate vector addition. • Students will know that subtracting a vector is equivalent to adding a negative vector. • Students will know that adding vectors going in opposite direction gives the zero vector as displacement is 0. • Students will know that any vector parallel to the vector a may be written as ha, where h is a non-zero scalar. • Students will know how to write the vectors of a path with magnitude and direction. • Students will know how to use vectors in problems involving parallelograms. • Students will know how to show two vectors are parallel with each other. • Students will know how to use vectors in problems involving ratio.		• *Students need to have a basic understanding of vectors and what they represent.* • *Students need to know how to solve problems with ratio.* • *Students need to have a basic understanding of parallel lines.* • *Students need to know how to collect like terms.* • *Students need to know how to represent ratios as fractions.* • *Students need to know how to add and subtract fractions.*	
Lesson 55: Representing vectors Lesson Objective: To learn how to represent vectors in column and unit vector form.	• Students will know that a vector can be described by its change in position or displacement relative to the x- and y-axes. • Students will know how to represent a vector in column form. • Students will know how to multiply a column vector by a scalar. • Students will know how to add and subtract column vectors.		• *Students need to know how to write vectors of line segments.* • *Students need to know how draw diagrams in the x and y planes.* • *Students need to know how to collect like terms.* • *Students need to know how to substitute into expressions.*	

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	• Students will know how to represent vector in unit vector form. • Students will know how to multiply a unit vector by a scalar. • Students will know how to add and subtract unit vectors. • Students will know how to represent unit and column vectors in a diagram. • Students will know how to represent unit and column vectors on a set of axes. • Students will know how to convert column vectors to and from unit vectors.			
Lesson 56: Magnitude and direction Lesson Objective: To learn how to find the magnitude and unit vectors in a given direction.	• Students will know the notation that represents the magnitude of a vector. • Students will know how to use Pythagoras' theorem to find the magnitude of a vector. • Students will know how to find the unit vector in the direction of a given vector by dividing the vector by the magnitude. • Students will know that to define a vector by giving its magnitude and the angle between the vector and one of the coordinate axes is called magnitude-direction form. • Students will know how to use standard trigonometric ratios to find the angle between the vector and one of the coordinate axes.		• *Students need to know how to use Pythagoras' theorem.* • *Students need to know how to manipulate column and unit vectors.* • *Students need to know that magnitude means length.* • *Students need to know how to represent vectors on a set of axes.* • *Students need to know how to use standard trigonometric ratios.*	
Lesson 57: Position vectors Lesson Objective: To learn how to find and use position vectors.	• Students will know how to use vectors to describe the position of a point in two dimensions. • Students will know that position vectors are vectors giving the position of a point, relative to a fixed origin. • Students will know how to find the position vector. • Students will know how to use the position vector to find other vectors. • Students will know how to find position vectors from given coordinates.		• *Students need to know how to manipulate column and unit vectors.* • *Students need to know how to find the magnitude of vectors.* • *Students need to know how to draw column and unit vectors on a set of axes.*	

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Lesson 58: Solving geometric problems Lesson Objective: To learn how to solve problems using vectors.	• Students will know how to use vectors to solve geometric problems. • Students will know how to find the position vector of a point that divides a line segment in a given ratio. • Students will know how to solve geometric problems by comparing coefficients on both sides of an equation involving parallel vectors.		• *Students need to know the properties of triangles, parallelograms and trapeziums.* • *Students need to know how to find column and unit vectors from a diagram.* • *Students need to know that a parallel vector is a multiple of the other.* • *Students need to know how to find position vectors.* • *Students need to know how to find the magnitude of vectors.* • *Students need to know how to find angles and sides using the sine and cosine rules.* • *Students need to know how to find vectors involving ratios.*	
Lesson 59: Modelling with vectors Lesson Objective: To learn how to model with vectors.	• Students need to know how to use vectors to solve problems in real-life context. • Students will know that speed is the magnitude of the velocity vector. • Students will know how to calculate the speed of a particle moving with a given velocity. • Students will know that distance is the magnitude of the displacement. • Students will know how to find the distance moved by a particle given a time and velocity. • Students will know how to use basic forces. • Students will know how to use vectors to solve a problem involving bearings.		• *Students need to know find and use bearings.* • *Students need to know how to find column and unit vectors from a diagram.* • *Students need to know how to use Pythagoras' theorem.* • *Students need to know how to find position vectors.* • *Students need to know how to find the magnitude of vectors.* • *Students need to know how to find angles and sides using the sine and cosine rules.* • *Students need to know how to use standard trigonometric ratios.*	