Year: 13
Subject: Mathematics - Mechanics

Term	Week	Focus	Summary	Learning Outcomes	Learning skills
Term 2.1	**1**	Integration	Further Integration techniques	Explore partial fractions, odd and even powers of trigonometric functions and volumes of revolution.	• Automaticity • Meta-cognition Resilience
	2	Mechanics	Vectors in 3D	Explore vectors using i,j and k notation and solve problems using calculus.	• Critical and logical thinking • Precision • Intellectual playfulness
	3	Differential equations	1st order differential equations	Explore forming and solving 1st order differential equations with separable variables	• Speed and accuracy • Automaticity • Flexible thinking
	4	Numerical Methods	Estimating using non-calculus methods	Explore change of sign to find root in an interval, Iteration formula and its use to find roots of equations approximate values, estimating areas under curves using mid-ordinate and Simpson's rule.	• Originality • Fluent thinking • Generalisation
	5	Vectors	Vector Algebra	Explore notation and arithmetic, position vectors in 3D, parallel vectors, unit vectors, magnitude of a vector.	• Strategy planning • Connection finding • Self regulation
	6	Vectors	Vector Algebra	Explore properties of a line joining two points, vector equation of a straight line, intersecting lines.	• Critical and logical thinking • Precision • Intellectual playfulness

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Term 2.2	**1**	Mechanics	Forces	Explore using F=ma with variable accelreation and projectile motion.	• Problem solving • Fluent thinking • Generalisation
	2	Mechanics	Forces	Explore the equation of a trajectory and the range for projectiles.	• Strategy planning • Connection finding • Self regulation
	3	Mechanics	Work, Energy and Power	Explore calculation of work done against resisting force.	• Big picture thinking • Hard working • Self regulation
	5	Mechanics	Work, Energy and Power	Explore power as rate at which work is being done (driving force D) P = Dv - Energy(Potential, Kinetic) and the Work Energy principle and conservation of mechanical energy.	• Problem solving • Automaticity • Generalisation
	6	Mechanics	Uniform Circular Motion	Explore angular velocity and acceleration, notation, motion in a horizontal circle.	• Critical and logical thinking • Precision • Intellectual playfulness