Year 12 Further Maths – Further Mechanics 1 Teacher

Topic		Ref	Ex
Momentum and impulse	**Momentum and impulse** • understand the definitions, derivation, and units of momentum and impulse; • understand what happens to the momentum of a sphere as a result of a collision; • be able to use the principle of conservation of momentum applied to direct collisions in 1-dimension	1.1	
Momentum and Impulse Assessment			
Work, Energy and Power	**Work and kinetic energy** • understand the derivation, units and definitions of work and energy; • be able to define kinetic energy (KE); • understand that work done on a body moving in a horizontal plane is the change in kinetic energy.	2.1	
	Potential energy, work-energy principle, conservation of mechanical energy, problem solving • understand the concept of gravitational potential energy (GPE); • be able to include GPE when applying the work-energy principle; • know the conditions for conservation of mechanical energy; • be able to solve problems involving work and energy	2.1	
	Power • understand that power in watts is the rate of doing work; • be able to calculate the power (P) of a vehicle with a tractive (driving) force F, moving with velocity v; • be able to use the formula $P = Fv$ in problem solving.	2.1	
Work, Energy and Power Assessment			

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Elastic Collisions in One Dimension	**Direct impact of elastic spheres, Newton's law of restitution and loss of kinetic energy due to impact** • be able to express the 'compressibility', 'bounciness' or 'elasticity' of an object by a value called the coefficient of restitution (e); • know that $0 \leq e \leq 1$ [and that $e = 0$ means inelastic and $e = 1$ means perfectly elastic]; • know and be able to use Newton's (experimental) law of restitution for direct impacts of elastic spheres; • be able to calculate the change in kinetic energy due to an impact.	3.1	
	Successive direct impacts of spheres and/or a sphere with a smooth plane surface • Spheres may be modelled as particles	3.2	
Elastic Collisions in One Dimension Assessment			