Personalised Learning Checklist

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MEI A Level Maths/Further Maths **Module M2** **1. Force**			
Understand that bodies in contact are subject to a frictional force and be able to draw an appropriate force diagram.			
Understand that the contact force between surfaces is expressed in terms of a frictional force and a normal contact force.			
Understand that the frictional force may be modelled by $F \leq \mu R$			
Be able to apply Newton's Laws to problems involving friction.			
Be able to draw a force diagram for a rigid body.			
Understand that a system of forces can have a turning effect on a rigid body.			
Be able to calculate the moment about a fixed axis of a force acting on a body.			
Understand and be able to apply the conditions for equilibrium of a rigid body to the solution of problems.			
Be able to identify whether equilibrium will be broken by sliding or toppling in simple cases.			
Be able to find the internal forces in a framework of light, pin-jointed rods.			
Be able to determine which rods in a framework are in compression and which in tension			
2. Work, Energy and Power			
Be able to calculate the work done by a force which moves along its line of action			
Be able to calculate the work done by a force which moves at an angle to its line of action.			
Be able to calculate kinetic energy.			
Understand the term mechanical energy.			

Understand the work-energy principle.			
Understand the terms conservative and dissipative forces.			
Be able to calculate gravitational potential energy.			
Be able to solve problems using the principle of conservation of energy.			
Understand that the power of a force is the rate at which it does work.			
Be able to apply the concept of power to the solution of problems.			
3. Impulse and Momentum			
Be able to calculate the impulse of a force as a vector.			
Understand the concept of momentum and appreciate that it is a vector quantity.			
Understand and be able to apply the Impulse-Momentum equation to problems.			
Understand that a system subject to no external force conserves its momentum.			
Be able to derive the conservation of momentum equation for a collision between two particles in one dimension.			
Be able to apply the principle of conservation of momentum to direct impacts within a system of bodies.			
Understand Newton's Experimental Law and the meaning of coefficient of restitution, and be able to apply it in modelling impacts.			
Be able to solve problems using both momentum conservation and Newton's Experimental Law.			
Understand that unless e = l, mechanical energy is not conserved during impacts , and be able to find it's loss.			
Understand that in an oblique impact between an object and a smooth plane, the impulse acts normal to the plane.			
Know that the velocity of the object parallel to the plane is unchanged by impact.			
Know that the direction of the component of the velocity perpendicular to the plane is reversed			

Know that the magnitude of the component of velocity perpendicular to the plane is multiplied by the coefficient of restitution.			
Be able to calculate the loss of kinetic energy in an oblique impact.			
Be able to solve problems involving oblique impact.			
4. Centre of Mass			
Be able to find the centre of mass of a system of particles of given position and mass.			
Appreciate how to locate centre of mass by appeal to symmetry.			
Be able to find the centre of a mass of a composite body by considering each constituent part as a particle.			
Be able to use the position of the centre of mass in problems involving the equilibrium of a rigid body.			