

# Personalised Learning Checklist

MEI A Level Maths/Further Maths

Module M1

## 1. Modelling

Understand the concept of a mathematical model.

Know the language used to describe simplifying assumptions.

Understand the particle model.

## 2. Vectors

Understand the language of vectors.

Be able to find the magnitude and direction of a vector given in component form.

Be able to express a vector in component form given its magnitude and direction.

Be able to carry out elementary operations on vectors.

Be able to apply vectors to mechanics problems.

## 3. Kinematics

Know the difference between position, displacement and distance.

Know the difference between velocity and speed, and between acceleration and magnitude of acceleration.

Be able to draw and interpret kinematics graphs, knowing the significance of their gradients and the areas underneath them.

Be able to differentiate position and velocity with respect to time and know what measures result.

Be able to integrate acceleration and velocity with respect to time and know what measures result.

Be able to recognise when the use of constant acceleration formulae is appropriate.

Be able to solve kinematics problems using constant acceleration formulae and calculus.

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Understand the language of kinematics appropriate to motion in 2 and 3 dimensions.			
Be able to extend techniques from motion in 1 to that in 2 and 3 dimensions by using vectors.			
Be able to find the cartesian equation of the path of a particle when its position vector is given in terms of time.			
Be able to use vectors to solve problems in kinematics.			
<b>4. Force</b>			
Be able to identify the forces acting on a system and represent them in a force diagram.			
Be able to resolve a force into components and be able to select suitable directions for resolution.			
Be able to find the resultant of several concurrent forces by vector addition.			
Know that a body is in equilibrium under a set of concurrent forces if and only if their resultant is zero.			
Know that vectors representing forces in equilibrium form a closed polygon.			
Be able to formulate and solve equations for equilibrium by resolving forces in suitable directions			
Be able to formulate and solve equations for equilibrium by way of a polygon of forces.			
<b>5. Newton's Laws of Motion</b>			
Know and understand the meaning of Newton's three laws.			
Understand the term equation of motion.			
Be able to formulate the equation of motion for a particle in 1-dimensional motion.			
Be able to formulate the equation of motion for a particle in 2- and 3- dimensional motion.			
Be able to formulate and solve separate equations of motion for connected particles.			
<b>6. Projectiles</b>			
Be able to formulate the equations of motion of a projectile.			

Know how to find the position and velocity at any time of a projectile, including the maximum height and range.			
Be able to find the initial velocity of a projectile given sufficient information.			
Be able to eliminate time from the component equations for horizontal and vertical displacement in terms of time.			
Be able to solve problems involving projectiles.			