

Triple Science - Physics Paper 2 Higher Tier Personal Learning Checklist (PLC)

P5 Forces and Motion

Learning Objectives:	Confidence		
	R	A	G
Calculate the resultant of two forces that act in a straight line			
Describe examples of the forces acting on an isolated object or system			
Use free body diagrams to qualitatively describe examples where several forces act on an object and explain how that leads to a single resultant force or no force			
Describe energy transfers involved when work is done and calculate the work done by recalling and using the equation: [$W = Fs$]			
Describe what a joule is and state what the joule is derived from			
Convert between newton-metres and joules.			
Explain why work done against the frictional forces acting on an object causes a rise in the temperature of the object			
State that a body in equilibrium must experience equal sums of clockwise and anticlockwise moments, recall and apply the equation: [$M = Fd$]			
Apply the idea that a body in equilibrium experiences an equal total of clockwise and anti-clockwise moments about any pivot			
Explain why the distance, d , must be taken as the perpendicular distance from the line of action of the force to the pivot			
Explain how levers and gears transmit the rotational effects of forces			
Describe an object which is slowing down as having a negative acceleration and estimate the magnitude of everyday accelerations			
Calculate the average acceleration of an object by recalling and applying the equation: [$a = \Delta v/t$]			

Represent motion using velocity–time graphs, finding the acceleration from its gradient and distance travelled from the area underneath			
Interpret enclosed areas in velocity–time graphs to determine distance travelled (or displacement)			
Measure, when appropriate, the area under a velocity–time graph by counting square			
Apply, but not recall, the equation: [$v^2 - u^2 = 2as$]			
Define and apply Newton's second law relating to the acceleration of an object			
Recall and apply the equation: [$F = ma$]			
Describe what inertia is and give a definition			
Estimate the speed, accelerations and forces of large vehicles involved in everyday road transport			
Required practical 7: investigate the effect of varying the force on the acceleration of an object of constant mass, and the effect of varying the mass of an object on the acceleration			
Describe a fluid as either a liquid or a gas and explain that the pressure in a fluid causes a force to act at right angles (normal) to the surface of its container			
Recall and apply the equation: [$p = F/A$]			
Explain why the pressure at a point in a fluid increases with the height of the column of fluid above and calculate differences in pressure in a liquid by applying [$p = h \rho g$]			
Describe up thrust an object and explain why the density of the fluid has an effect on the up thrust experienced by an object submerged in it			
Explain why an object floats or sinks, with reference to its weight, volume and the up thrust it experiences			
Describe a simple model of the Earth's atmosphere and of atmospheric pressure, explaining why atmospheric pressure varies with height above a surface			

P6 Waves

Learning Objectives:	Confidence		
	R	A	G
Describe a wave's ability to be reflected, absorbed or transmitted at the boundary between two different materials			
Draw the reflection of a wave at a surface by constructing ray diagrams			
Required practical 9 (physics only): investigate the reflection of light by different types of surface and the refraction of light by different substances.			
Explain how different wavelengths of electromagnetic radiation are reflected, refracted, absorbed or transmitted differently by different substances and types of surface			
Illustrate the refraction of a wave at the boundary between two different media by constructing ray diagrams			
Describe what refraction is due to and illustrate this using wave front diagrams			
State that a lens forms an image by refracting light and that the distance from the lens to the principal focus is called the focal length			
Explain that images produced by a convex lens can be either real or virtual, but those produced by a concave lens are always virtual			
Construct ray diagrams for both convex and concave lenses			
Calculate magnification as a ratio with no units by applying, but not recalling, the formula: [magnification = image height / object height]			
Describe what electromagnetic waves are and explain how they are grouped			
List the groups of electromagnetic waves in order of wavelength			
Explain that because our eyes only detect a limited range of electromagnetic waves, they can only detect visible light			
Explain how different wavelengths of electromagnetic radiation are			

reflected, refracted, absorbed or transmitted differently by different substances and types of surface			
State examples of the dangers of each group of electromagnetic radiation and discuss the effects of radiation as depending on the type of radiation and the size of the dose			
State examples of the uses of each group of electromagnetic radiation, explaining why each type of electromagnetic wave is suitable for its applications			