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

## P5 Forces and Motion

| **Learning Objectives:** | **Confidence** | | |
|---|---|---|---|
| | **R** | **A** | **G** |
| Describe weight and explain that its magnitude at a point depends on the gravitational field strength | | | |
| Calculate weight by recalling and using the equation: [ W = mg ] | | | |
| Represent the weight of an object as acting at a single point which is referred to as the object's 'centre of mass' | | | |
| Describe examples of the forces involved in stretching, bending or compressing an object | | | |
| Explain why, to change the shape of an object (by stretching, bending or compressing), more than one force has to be applied – this is limited to stationary objects only | | | |
| Describe the difference between elastic deformation and inelastic deformation caused by stretching forces | | | |
| Describe the extension of an elastic object below the limit of proportionality and calculate it by recalling and applying the equation: **[ F = ke ]** | | | |
| Explain why a change in the shape of an object only happens when more than one force is applied | | | |
| Describe factors that can affect a driver's reaction time | | | |
| Explain methods used to measure human reaction times and recall typical results | | | |
| Interpret and evaluate measurements from simple methods to measure the different reaction times of students | | | |
| Evaluate the effect of various factors on thinking distance based on given data | | | |
| Explain methods used to measure human reaction times and take, interpret and evaluate measurements of the reaction times of students | | | |

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| Explain how the braking distance of a vehicle can be affected by different factors, including implications for road safety | | | |
| Explain how a braking force applied to the wheel does work to reduce the vehicle's kinetic energy and increases the temperature of the brakes | | | |
| Explain and apply the idea that a greater braking force causes a larger deceleration and explain how this might be dangerous for drivers | | | |
| Draw and interpret velocity-time graphs for objects that reach terminal velocity | | | |
| Interpret and explain the changing motion of an object in terms of the forces acting on it | | | |
| Explain how an object falling from rest through a fluid due to gravity reaches its terminal velocity | | | |

# P6 Waves

| **Learning Objectives:** | **Confidence** | | |
|---|---|---|---|
| | **R** | **A** | **G** |
| Describe waves as either transverse or longitudinal, defining these waves in terms of the direction of their oscillation and energy transfer and giving examples of each | | | |
| Define waves as transfers of energy from one place to another, carrying information | | | |
| Define amplitude, wavelength, frequency, period and wave speed and Identify them where appropriate on diagrams | | | |
| State examples of methods of measuring wave speeds in different media and Identify the suitability of apparatus of measuring frequency and wavelength | | | |
| Calculate wave speed, frequency or wavelength by applying, but not recalling, the equation: **[ v = f λ] and** calculate wave period by recalling and applying the equation: **[ T = 1/f ]** | | | |
| 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 | | | |

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| 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 | | | |

# P7 Magnetism

| **Learning Objectives:** | **Confidence** | | |
|---|---|---|---|
| | **R** | **A** | **G** |
| Describe the attraction and repulsion between unlike and like poles of permanent magnets and explain the difference between permanent and induced magnets | | | |
| Draw the magnetic field pattern of a bar magnet, showing how field strength and direction are indicated and change from one point to another | | | |
| Explain how the behaviour of a magnetic compass is related to evidence that the core of the Earth must be magnetic | | | |
| Describe how to plot the magnetic field pattern of a magnet using a compass | | | |
| State examples of how the magnetic effect of a current can be demonstrated and explain how a solenoid arrangement can increase the magnetic effect of the current | | | |
| Draw the magnetic field pattern for a straight wire carrying a current and for a solenoid (showing the direction of the field) | | | |
| Interpret diagrams of electromagnetic devices in order to explain how they work | | | |
| State and use Fleming's left-hand rule and explain what the size of the induced force depends on | | | |
| Calculate the force on a conductor carrying a current at right angles to a magnetic field by applying, but not recalling, the equation: [ F = BIL ] | | | |