# AQA GCSE **– Physics** – Paper 2 Learning Pathway

## Equations you need to learn for paper 2:

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|---|---|---|---|---|
| $W = m\ g$ | $M = F\ d$ | $F = K\ e$ | $s = v\ t$ | $v = f\ \lambda$ |
| $F = m\ a$ | $p = m\ v$ | $W = m\ g$ | $P = \frac{F}{A}$ | $a = \frac{\Delta v}{t}$ |

## Learning objectives for paper 2:

| P8 | Forces in Balance | | Revised | Understood |
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| P8.1 | Vectors and scalars | State what Displacement is.<br>State that a Scalar is a quantity with magnitude only.<br>State that a vector is a quantity with magnitude and direction.<br>Describe how vectors can be represented using scale drawings. | | |
| P8.2 | Forces between objects | State what a force can do and its unit.<br>State what a contact force is and give examples.<br>State Newton's third law and apply this to situations. | | |
| P8.3 | Resultant forces | State what a resultant for is.<br>Describe the motion of an object with a resultant for acting.<br>Calculate the resultant force along a line. | | |
| P8.6 | Centre of mass | State what the centre of mass of an object is.<br>Describe an experiment to find the centre of mass of an object. | | |
| P8.8 | The parallelogram of forces | Draw scale drawings to find the resultant force of two forces.<br>Use of either nose to tail drawings or the parallelogram of forces. | | |
| P8.9 | Resolution of forces | State that a force can be resolved into 2 perpendicular forces.<br>Use scale drawings to resolve a single force into 2 perpendicular components. | | |
| P9 | Motion | | | |
| P9.1 | Speed and distance-time graphs | State and use the equation for velocity of an object.<br>Identify the motion of an object from a distance-time graph.<br>Calculate the speed of an object from a d-t graph using the gradient. | | |
| P9.2 | Velocity and acceleration | State the difference between speed and velocity.<br>State and use the equation for acceleration.<br>Define acceleration. | | |
| P9.3 | More about velocity time graphs | Identify the motion of an object from the velocity-time graph.<br>Calculate the acceleration of an object from the gradient of a v-t graph.<br>Calculate the displacement of an object from a v-t graph. | | |
| P9.4 | Analysing motion graphs | Calculate the speed of an object from a d-t graph using the gradient.<br>Calculate the acceleration of an object from the gradient of a v-t graph.<br>Calculate the displacement of an object from a v-t graph. | | |
| P10 | Force and motion | | | |
| P10.1 | Force and acceleration | State and use Newton's 2nd law, F=ma.<br>Describe an experiment into the relationship between force and acceleration.<br>State what is meant by the inertia and the inertial mass of an object. | | |
| P10.2 | Weight and terminal velocity | Explain the difference between mass and weight.<br>Describe the motion of an object as it goes from stationary to terminal velocity.<br>Explain what happens to the resultant force on an object as it goes from stationary to a terminal velocity. | | |
| P10.3 | Forces and braking | Describe the forces that act against a moving object.<br>State what the thinking, braking and stopping distances are for a vehicle.<br>Describe what factors affect thinking, braking and stopping distances for a vehicle. | | |
| P10.4 | Momentum | State and use the equation for momentum.<br>State the principle of the conservation of momentum.<br>Explain what a closed system is. | | |
| P10.8 | Forces and elasticity | State Hooke's law as F=ke.<br>Describe an experiment to investigate the spring constant of an object.<br>Explain what is meant by the terms elastic, limit of proportionality, permanent deformation, elastic limit. | | |

| P12 | Wave properties | | | |
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| P12.1 | The nature of waves | Define what a wave is.<br>Define what a longitudinal wave is and give examples.<br>Define what a transverse wave is and give examples.<br>Identify area of compression and rarefaction in a longitudinal wave. | | |
| P12.2 | The properties of waves | Describe wave motion in terms of amplitude, wavelength, frequency and period.<br>Define amplitude of a wave.<br>Use the equation for frequency and time period to calculate either.<br>Define the frequency of a wave.<br>Describe a method to find the speed, frequency and wavelength of ripples in a ripple tank. | | |
| P12.3 | Reflection and refraction | Describe what reflection is.<br>Describe what refraction is with reference to the change in speed of a wave between two mediums.<br>Construct a ray diagram to show refraction at the boundary between two mediums. | | |
| P12.4 | More about waves | Describe an experiment to find the speed, frequency and wavelength of waves on a string.<br>Describe a method to find the speed of sound in air. | | |
| P13 | Electromagnetic waves | | | |
| P13.1 | The electromagnetic spectrum | State the parts of the electromagnetic spectrum.<br>State and use the equation for the speed of a wave.<br>State which part of the EM spectrum we can detect with our eyes. | | |
| P13.2 | Light, infrared, microwaves, and radio waves | Describe the properties of white light.<br>State uses of infrared, microwaves, and radio waves.<br>Describe an experiment into the emission of infra-red radiation from different surfaces. | | |
| P13.3 | Communications | Describe how radio waves are formed by oscillations in a electrical circuit.<br>Describe how radio waves can produce alternating currents with the same frequency.<br>Explain how the properties of light, infrared, microwaves, and radio waves make them suitable for an application | | |
| P13.4 | Ultraviolet waves, x-rays, and gamma rays | State what Ionising radiation is.<br>Describe the uses of ultraviolet, x-rays, and gamma rays.<br>Explain why ultraviolet waves, x-rays, and gamma rays are dangerous. | | |
| P13.5 | X-rays in medicine | Explain how x-rays can be used in medical imaging.<br>Describe what is meant by a radiation dose.<br>Explain the use of x-rays in treating cancer. | | |
| P15 | Electromagnetism | | | |
| P15.1 | Magnetic fields | Describe the attraction and repulsion between link and unlike poles.<br>Describe the difference between permanent and induced magnets.<br>State what a magnetic field is.<br>Explain how to plot and draw the magnetic field lines of a bar magnet.<br>Explain how the behaviour of a compass is related to the core of the Earth. | | |
| P15.2 | Magnetic fields of electric currents | State that a current carrying wire causes a magnetic field and describe its shape.<br>State what a solenoid is.<br>Describe the shape and strength of a magnetic field around a solenoid.<br>Explain how to increase the strength of a magnetic field around a solenoid. | | |
| P15.4 | The motor effect | State and use Flemings left hand rule.<br>Use the equation for the force on a current carrying wire in a magnetic field.<br>Explain how a motor works.<br>Explain how the speed of a motor can be increased. | | |

| Topic | P8 | P9 | P10 | P12 | P13 | P15 |
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| Recall test (%) | | | | | | |
| Topic Test (%) | | | | | | |