Physics GCSE Year 9

Physics	Spec points covered	
Vectors and scalars	P1.1 P1.2 P1.3 P1.10	Explain the difference between vector and scalar quantities Recall vector and scalar quantities including: (a) displacement / distance (b) velocity / speed (c) acceleration (d) force (e) weight / mass (f) momentum (g) energy Recall that velocity is speed in a stated direction Recall some typical speeds encountered in everyday experience for wind and sound, and for walking, running, cycling and other transportation systems
Distance/Time graphs and speed	P1.4 P1.5 P1.9	Recall and use the equations: (a) (average) speed (metre per second, m/s) = distance (metre, m) / time (s) (b) distance travelled (metre, m) = average speed (metre per second, m/s) x time (s) Analyse distance/time graphs including determination of speed from the gradient Describe a range of laboratory methods for determining the speeds of objects such as the use of light gates
Acceleration	P1.6 P1.7 P1.11	Recall and use the equation: acceleration (metre per second squared, m/s^2) = change in velocity (metre per second, m/s) / time taken (second, s) $a = (v-u)/t$ Use the equation: (final velocity $)^2$ ((metre/second$)^2$, $(m/s)^2$ – (initial velocity$)^2$((metre/second$)^2$, $(m/s)^2$) = 2 × acceleration (metre per second squared, m/s^2) × distance (metre, m) $v^2 - u^2 = 2 \times a \times x$ Recall that the acceleration, g, in free fall is 10 m/s^2 and be able to estimate the magnitudes of everyday accelerations
Velocity/time graphs	P1.8	Analyse velocity/time graphs to: a compare acceleration from gradients qualitatively b calculate the acceleration from the gradient (for uniform acceleration only) c determine the distance travelled using the area between the graph line and the time axis (for uniform acceleration only)
Resultant forces	P1.12	Recall Newton's first law and use it in the following situations: a where the resultant force on a body is zero i.e. the body is moving at a constant velocity or is at rest b where the resultant force is not zero i.e. the speed and/or direction of the body changes.
Newton's First law	P1.12 P1.16	Recall Newton's first law and use it in the following situations: a where the resultant force on a body is zero i.e. the body is moving at a constant velocity or is at rest

	P1.17	b where the resultant force is not zero i.e. the speed and/or direction of the body changes **Explain that an object moving in a circular orbit at constant speed has a changing velocity (qualitative only)** **Explain that for motion in a circle there must be a resultant force known as a centripetal force that acts towards the centre of the circle**
Mass and weight	P1.14	Recall and use the equation: weight (newton, N) = mass (kilogram, kg) x gravitational field strength (newton per kilogram, N/kg), W = m × g
Acceleration (Newton's Second law)	P1.13 P1.18 P1.15	Recall and use Newton's second law as force (newton, N) = mass (kilogram, kg) × acceleration (metre per second squared, m/s^2) F = m × a Explain that inertial mass is a measure of how difficult it is to change the velocity of an object (including from rest) and know that it is defined as the ratio of force over acceleration. *Investigate the relationship between force, mass and acceleration*
Newton's Third law	P1.19 P1.19	Recall and apply Newton's third law to equilibrium situations. [**Apply Newton's third law] to collision interactions**
Momentum	P1.19 P1.20 P1.21	[Apply Newton's third law] **to collision interactions and relate it to the conservation of momentum in collisions.** **Recall and use the equation: momentum (kilogram metre per second, kg m/s) = mass (kilogram, kg) x velocity (metre per second, m/s) p = m x v** **Use Newton's second law as: force (newton, N) = change in momentum (kilogram meter per second, kg m/s) / time (second, s) F = (mv – mu)/t**
Stopping distances	P1.22 P1.23 P1.24 P1.25	Explain methods of measuring human reaction times and recall typical results Recall that the stopping distance of a vehicle is made up of the sum of the thinking distance and the braking distance. Explain that the stopping distance of a vehicle is affected by a range of factors including: a) the mass of the vehicle b) the speed of the vehicle c) the driver's reaction time d) the state of the vehicle's brakes e) the state of the road f) the amount of friction between the tyre and the road surface. Describe the factors affecting a driver's reaction time including drugs and distractions
Crash Hazards	P1.26 P1.26	Explain the dangers caused by large decelerations… **estimate the forces involved [in large decelerations] in typical situations on a public road.**