AQA P5c Newton's Laws
Triple Physics

Required Practical for this topic:
F = ma

Newton's Laws	Newton's 1st Law	If an object experiences zero resultant force it does not accelerate
	Newton's 2nd law	The resultant force equals the mass × acceleration
	The greater the resultant force	The greater the acceleration
	The greater the mass	The smaller the acceleration for a given force
	Inertia	The tendency not to accelerate
	Forces	Occur in pairs of the same type
	Newton's 3rd law	If object A exerts a force on object B, then object B exerts a force of equal magnitude and opposite direction on object A
	When brakes are applied	Friction does work
	When brakes are applied	The kinetic energy store of the wheels decreases and the thermal energy store of the brakes increases.
Force (*N*) = mass (*kg*) ÷ acceleration (m/s^2) (F = m × a)		

Momentum and collisions	Thinking distance	The distance travelled as the driver reacts
	Human reaction time	Typical values range from 0.2 s to 0.9 s.
	Braking distance	The distance travelled as the driver applies the brakes
	Stopping distance	Thinking distance + Braking distance
	Braking distance increases with	Higher speed, higher mass, poor weather, poor vehicle conditions
	Thinking distance increases with	Higher speed, drink, drugs, distractions
	Momentum unit	Kilogram metres per second (kgm/s)
	Closed system	A group of objects with no external forces acting on them
	Principle of conservation of momentum	For any interaction in a closed system the total momentum before and afterwards is equal.
	Momentum	is a vector
	During a collision between two objects	Momentum is conserved and the two forces are equal in magnitude and opposite in direction.
	During a collision the force can be reduced	By increasing the collision time
	Safety features that increase collision time are	Cycle helmets, air bags, seat belts, crumple zones
Momentum = mass × velocity (p = mv)		
Force = change in momentum ÷ time (F = mΔv ÷ t)		