AQA GCSE Combined Science: Trilogy
Topic Checklists

6.5 Forces

6.5.1 Forces and Their Interactions				
Topic	**Success Criteria**	**Progress**		
Scalar and Vector Quantities	I can explain the difference between scalar and vector quantities.			
	I can describe how to represent a vector quantity.			
Contact and Non–Contact Forces	I can give a definition for the term 'force'.			
	I can describe the difference between a contact and a non–contact force.			
	I can give examples of contact forces.			
	I can give examples of non–contact forces.			
	I can state whether force is a scalar or vector quantity.			
	I can describe the interaction between pairs of objects which produce a force on each object.			
Gravity	I can describe what weight is.			
	I can describe what affects the force of gravity close to the Earth.			
	I can describe what affects the weight of an object.			
	I can recall and apply the correct equation to calculate the weight of an object.			
	I can rearrange the equation linking gravitational field strength, mass and weight to calculate gravitational field strength or mass.			
	I can describe where the weight of an object can be considered to act.			
	I can describe how the weight and mass of an object are related.			
	I can name the piece of equipment used to measure weight.			

Topic	Success Criteria	Progress		
Resultant Forces	I can explain what is meant by a resultant force.			
	I can calculate the resultant of two forces that act in a straight line.			
	(HT only) I can describe examples of the forces acting on an isolated object or system.			
	(HT only) I can use free body diagrams to describe qualitatively examples where several forces lead to a resultant force on an object, including balanced forces when the resultant force is zero.			
	(HT only) I can describe the relationship between a single force and its two components when it is resolved.			
	(HT only) I can use vector diagrams to illustrate the resolution of a single force into two components, to include both magnitude and direction.			
	(HT only) I can use vector diagrams to illustrate equilibrium situations, to include both magnitude and direction.			
	(HT only) I can use vector diagrams to determine the resultant of two forces, to include both magnitude and direction.			

6.5.2 Work Done and Energy Transfer

Topic	Success Criteria	Progress		
Work Done and Energy Transfer	I can describe how force causes work to be done on an object.			
	I can recall and apply the correct equation to calculate the work done by a force on an object.			
	I can rearrange the equation linking distance, force and work done to calculate the force or the distance moved by an object along the line of action of a force.			
	I can convert between newton–metres and joules.			
	I can describe the energy transfer involved when work is done.			
	I can explain how work done against the frictional forces acting on an object affects the temperature of an object.			

6.5.3 Forces and Elasticity				
Topic	**Success Criteria**	**Progress**		
Forces and Elasticity	I can give examples of the forces involved in stretching, bending, or compressing an object.			
	I can explain why, to change the shape of a stationary object, more than one force has to be applied.			
	I can describe the difference between elastic deformation and inelastic deformation caused by stretching forces.			
	I can describe the relationship between the extension of an elastic object and the force applied.			
	I can recall and apply the correct equation to calculate the force applied to a spring.			
	I can rearrange the equation linking extension, force and spring constant to calculate the spring constant or extension of an elastic object.			
	I can describe the relationship between the work done on a spring and the elastic potential energy stored, provided the spring is not inelastically deformed.			
	I can describe the difference between a linear and non–linear relationship between force and extension.			
	I can apply the correct equation from the physics equation sheet to calculate the work done in stretching (or compressing) a spring (up to the limit of proportionality).			
	I can calculate relevant values of stored energy and energy transfers.			
	I can interpret data from an investigation of the relationship between the extension of an elastic object and the force applied.			
	I can describe a method to investigate the relationship between force and extension for a spring (required practical activity 18).			

6.5.4 Forces and Motion

6.5.4.1 Describing Motion along a Line

Topic	Success Criteria	Progress		
Distance and Displacement	I can give a definition for distance.			
	I can state whether distance is a scalar or vector quantity.			
	I can give a definition for displacement.			
	I can state whether displacement is a scalar or vector quantity.			
	I can express displacement in terms of both magnitude and direction.			
Speed	I can state whether speed is a scalar or vector quantity.			
	I can describe what happens to speed when people walk, run or travel in a car.			
	I can give some factors that affect the speed at which a person can walk, run or cycle.			
	I can recall the typical speed for a person walking.			
	I can recall the typical speed for a person running.			
	I can recall the typical speed for a person cycling.			
	I can recall the typical values of speed for different types of transportation systems.			
	I can give two examples of things other than objects that have varying speed.			
	I can give a typical value for the speed of sound in air.			
	I can make measurements of distance and time.			
	I can calculate the speed of an object from measurements of the distance and time.			
	I can recall and apply the correct equation to calculate the distance travelled by an object moving at a constant speed.			
	I can rearrange the equation linking distance travelled, speed and time to calculate the speed of an object or the time taken to travel a particular distance.			
	I can calculate the average speed for an object with non–uniform motion.			

Topic	Success Criteria	Progress		
Velocity	I can give a definition for velocity.			
	I can state whether velocity is a scalar or vector quantity.			
	(HT only) I can explain qualitatively, with examples, how speed and velocity are affected by motion in a circle.			
The Distance–Time Relationship	I can describe what a distance–time graph can be used to represent.			
	I can state what can be calculated from the gradient of a distance–time graph.			
	(HT only) I can describe how to use a distance–time graph to calculate the speed of an accelerating object at any particular time.			
	I can draw distance–time graphs from measurements.			
	I can interpret lines and slopes of distance–time graphs to translate the graphical information into numerical form.			
	I can determine speed from a distance–time graph.			

Topic	Success Criteria	Progress		
Acceleration	I can recall and apply the correct equation to calculate the average acceleration of an object.			
	I can rearrange the equation linking acceleration, change in velocity and time taken to calculate the change in velocity or time taken for an accelerating object.			
	I can give the term used to describe an object that is slowing down.			
	I can estimate the magnitude of everyday accelerations.			
	I can describe how to use a distance–time graph to calculate acceleration.			
	(HT only) I can describe how to calculate the distance travelled by an object (or displacement of an object) from a velocity–time graph.			
	I can draw velocity–time graphs from measurements.			
	I can interpret lines and slopes of velocity–time graphs to determine acceleration.			
	(HT only) I can interpret closed areas in velocity–time graphs to determine distance travelled (or displacement).			
	I can apply the equation linking final velocity, initial velocity, acceleration and distance from the physics equation sheet.			
	I can rearrange the equation linking final velocity, initial velocity, acceleration and distance from the physics equation sheet.			
	I can state the approximate acceleration of an object falling freely under gravity near the Earth's surface.			
	I can explain how the motion of an object will change as it falls through a fluid.			
	I can explain what is meant by terminal velocity.			

6.5.4.2 Forces, Accelerations and Newton's Laws of Motion				
Topic	**Success Criteria**	**Progress**		
Newton's First Law	I can state Newton's First Law.			
	I can describe the relationship between the resistive forces and the driving forces acting on an object when it is travelling at a steady speed.			
	I can apply Newton's First Law to explain the motion of objects moving with a uniform velocity.			
	I can apply Newton's First Law to explain the motion of objects where speed and/or direction changes.			
	(HT only) I can give the term used to describe the tendency of objects to continue in their state of rest or of uniform motion.			
Newton's Second Law	I can state Newton's Second Law.			
	I can recognise and use the symbol for proportionality.			
	I can recall and apply the correct equation to calculate the resultant force acting on an accelerating object.			
	I can rearrange the equation linking acceleration, mass and resultant force to calculate the acceleration or the mass of an object.			
	(HT only) I can explain what inertial mass is.			
	(HT only) I can define inertial mass as a ratio of other variables.			
	I can estimate the speed, accelerations and forces involved in large accelerations for everyday road transport.			
	I can recognise and use the symbol that indicates an approximate value.			
	I can describe a method to investigate the effect of varying the force on the acceleration of an object of constant mass (required practical activity 19).			
	I can describe a method to investigate the effect of varying the mass of an object on the acceleration produced by a constant force (required practical activity 19).			
Newton's Third Law	I can state Newton's Third Law.			
	I can apply Newton's Third Law to examples of equilibrium situations.			

6.5.4.3 Forces and Braking				
Topic	**Success Criteria**	**Progress**		
Stopping Distance	I can describe the two distances that make up the stopping distance of a vehicle.			
	I can describe how the speed of the vehicle affects the stopping distance for a given braking force.			
Reaction Time	I can give the typical range of reaction times for a person.			
	I can name four factors that can affect a driver's reaction time.			
	I can explain methods to measure human reaction times and recall typical results.			
	I can interpret and evaluate measurements from simple methods to measure the different reaction times of students.			
	I can evaluate the effect of various factors on thinking distance based on given data.			
Factors Affecting Braking Distance 1	I can describe what affects the braking distance of a vehicle.			
	I can describe what is meant by poor road conditions.			
	I can describe what is meant by poor condition of a vehicle.			
	I can explain the factors which affect the distance required for road transport vehicles to come to rest in emergencies, and the implications for safety.			
	I can estimate how the distance required for road vehicles to stop in an emergency varies over a range of typical speeds.			
Factors Affecting Braking Distance 2	I can explain the energy transfers involved when a force is applied to the brakes of a vehicle.			
	I can explain how the speed of the vehicle will affect the braking force needed to stop a vehicle in a certain distance.			
	I can explain how the size of the braking force will affect the deceleration of a vehicle.			
	I can explain the dangers caused by large decelerations.			

6.5.5 Momentum (HT Only)				
Topic	**Success Criteria**	**Progress**		
Momentum Is a Property of Moving Objects	I can recall and apply the correct equation to calculate the momentum of a moving object.			
	I can rearrange the equation linking mass, momentum and velocity to calculate the mass or velocity of a moving object.			
Conservation of Momentum	I can describe what is meant by the conservation of momentum.			
	I can describe and explain examples of momentum in an event, such as a collision.			