Physics – Forces **Points in bold are HT only**

Content	End
Name contact and non-contact forces and describe their interaction	
Define scalar and vector quantities and give examples of each	
Calculate resultant forces	
Define weight and use w=m x g to calculate any one of those values	
Define 'centre of mass'	
Draw free body diagrams to scale including **resolving forces at different angles**	
Know the equation to calculate work done and apply this to find work done, force or distance	
Describe the relationship between joules and newton-metres and convert between them	
Give examples of forces involved in stretching or compression and explain the difference between elastic deformation and inelastic deformation	
Describe the features of a graph of force applied versus the extension of a spring	
Know Hooke's Law (f = ke) and apply it in stretching or compression scenarios	
Calculate work done during stretching or compressing using $e= ½ k x e^2$	
Interpret distance-time graphs to calculate velocity and total distance moved	
Explain the difference between distance and displacement	
Know typical values for speed for walking, running, cycling and sensible values for car, train and airplane speeds	
Describe the difference between velocity and speed and calculate them using s=d/t	
Describe circular motion in terms of speed and direction	
Interpret distance time graphs to find speed, **including drawing a tangent if the object is accelerating**	
Describe what is meant by acceleration	

Content	End
Calculate the acceleration or deceleration of an object using a=v-u/t, using negative values to represent deceleration	
Use uniform acceleration equation to calculate acceleration, velocity or distance	
Know that acceleration under gravity is 9.8 m/s^2	
Interpret velocity-time graphs to calculate acceleration, velocity **and total distance/displacement**	
Describe the change in forces that occur during free fall of an object through a fluid	
Define terminal velocity	
Apply Newton's first law to predict the effect of balanced and unbalanced forces on stationary and moving objects	
Explain what is meant by 'inertia'	
Use Newton's second law (f=ma) to calculate force, mass or acceleration	
Define inertial mass and calculate it using force/acceleration	
Apply Newton's third law to equilibrium situations – ie describe how forces exerted by two objects interacting are equal and opposite	
Define the terms stopping distance, thinking distance and braking distance and know how speed affects overall stopping distance	
Explain how reaction time can affect thinking distance and how this can be measured	
Describe physical factors that can affect braking distance – condition of tyres, road etc	
Explain why large decelerations are dangerous **and estimate values forces involved in deceleration of road vehicles**	
Describe what is meant by momentum and calculate values from an equation	
Explain what is meant by 'conservation of momentum' and apply this in calculations	