THE HIGHFIELD SCHOOL

Curriculum Plan
Department/subject: Physics Year 10
Our Vision: **We take opportunities and aspire to excellence**
Our Intent:

- All students will experience a curriculum richness, breadth and depth
- The curriculum equips every student with the knowledge and skills for the future in our local area and beyond
- The curriculum builds on prior knowledge and creates a 'web of knowledge'
- Gaps in knowledge and skills are identified and addressed quickly

Year	Autumn 1	Autumn 2
Knowledge to be taught	**Forces 5a - Force Basics** • Identify and describe scalar quantities and vector quantities • Identify and give examples of forces as contact or non-contact forces • Describe the interaction between two objects and the force produced on each as a vector • Describe weight and explain that its magnitude at a point depends on the gravitational field strength • Calculate weight by recalling and using the equation: [W = mg] • Represent the weight of an object as acting at a single point which is referred to as the object's 'centre of mass' • Calculate the resultant of two forces that act in a straight line • HT ONLY: describe examples of the forces acting on an isolated object or system • HT ONLY: Use free body diagrams to qualitatively describe examples where several forces act on an object and explain how that leads to a single resultant force or no force • HT ONLY: Use free body diagrams and accurate vector diagrams to scale, to resolve multiple forces and show magnitude and direction of the resultant	**Forces 5b – Forces and their Effects** • Describe examples of the forces involved in stretching, bending or compressing an object • Explain why, to change the shape of an object (by stretching, bending or compressing), more than one force has to be applied – this is limited to stationary objects only • Describe the difference between elastic deformation and inelastic deformation caused by stretching forces • Describe the extension of an elastic object below the limit of proportionality and calculate it by recalling and applying the equation: [F = ke] • Explain why a change in the shape of an object only happens when more than one force is applied • Describe and interpret data from an investigation to explain possible causes of a linear and non-linear relationship between force and extension • Calculate work done in stretching (or compressing) a spring (up to the limit of proportionality) by applying, but not recalling, the equation: [Ee= ½ke2] • Required practical 6: investigate the relationship between force and extension for a spring.

	• HT ONLY: Use vector diagrams to illustrate resolution of forces, equilibrium situations and determine the resultant of two forces, to include both magnitude and direction • Describe energy transfers involved when work is done and calculate the work done by recalling and using the equation: [W = Fs] • Describe what a joule is and state what the joule is derived from • Convert between newton-metres and joules. • Explain why work done against the frictional forces acting on an object causes a rise in the temperature of the object	• PHY ONLY: State that a body in equilibrium must experience equal sums of clockwise and anticlockwise moments, recall and apply the equation: [M = Fd] • PHY ONLY: Apply the idea that a body in equilibrium experiences an equal total of clockwise and anti-clockwise moments about any pivot • PHY ONLY: Explain why the distance, d, must be taken as the perpendicular distance from the line of action of the force to the pivot • PHY ONLY: Explain how levers and gears transmit the rotational effects of forces • PHY ONLY: Describe a fluid as either a liquid or a gas and explain that the pressure in a fluid causes a force to act at right angles (normal) to the surface of its container • PHY ONLY: Recall and apply the equation: [p = F/A] • PHY & HT ONLY: Explain why the pressure at a point in a fluid increases with the height of the column of fluid above and calculate differences in pressure in a liquid by applying [p = h ρ g] • PHY & HT ONLY: Describe up thrust an object and explain why the density of the fluid has an effect on the up thrust experienced by an object submerged in it • PHY & HT ONLY: Explain why an object floats or sinks, with reference to its weight, volume and the up thrust it experiences • PHY ONLY: Describe a simple model of the Earth's atmosphere and of atmospheric pressure, explaining why atmospheric pressure varies with height above a surface
Keywords	• displacement • driving force • effort • force multiplier	• upthrust • forces • Load • resultant force

	• forces • free-body force diagram • friction • load • magnitude • resultant force • scalar • vector	• elastic • extension • gravitational field strength, *g* • limit of proportionality • terminal velocity • weight
Links to prior knowledge	• Links to KS3 Forces and Motion topic (Yr8) • Links to KS3 Forces topic (Yr7)	• Links to KS3 Forces and Motion topic (Yr8) • Links to KS3 Forces topic (Yr7)
How knowledge is assessed	• An end of unit test will cover the main ideas in the topic. This will be marked by the teacher and a feedback lesson will go over the assessment in detail. • Green pens are used for self and peer assessment to build up students' understanding of their own misconceptions and ideas. • Homework tasks via Show My Homework.	• An end of unit test will cover the main ideas in the topic. This will be marked by the teacher and a feedback lesson will go over the assessment in detail. • Green pens are used for self and peer assessment to build up students' understanding of their own misconceptions and ideas. • Homework tasks via Show My Homework.
How gaps will be addressed	• Gaps in knowledge will be identified by any of the strategies above. • Formally marked work will require a response from the student and subsequent work in lessons will link back to the areas of need. • End of unit test feedback to require one lesson dedicated to addressing gaps in knowledge and exam skills	• Gaps in knowledge will be identified by any of the strategies above. • Formally marked work will require a response from the student and subsequent work in lessons will link back to the areas of need. • End of unit test feedback to require one lesson dedicated to addressing gaps in knowledge and exam skills
Cultural capital lessons	Physical: Practical techniques, health and safety, development of fine motor and dexterity skills.	Cultural: How ideas in Science are accepted by society. Physical: Practical techniques, health and safety, development of fine motor and dexterity skills.

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EQUALITY & EQUITY
RESPONSIBILITY
DEMOCRACY
SOLIDARITY
SELF HELP