Newport Girls' High School **Y7-11 Learning Overview**

Subject:	Physics	**Lead Teacher:**	Dr M S Catalan	**Year:**	9

Curriculum organisation

Students are taught in mixed groups of **30** for **two** hours per week. They are not grouped by ability.

Overview of Topics & Key Information

Term	Unit(s) of Work	Key Enquiry Questions	Key Content/ Terminology	Skills developed	**How will your child be learning?**
Autumn Term	FORCES Types of forces Identifying forces in real-life situations Representing forces and free-body diagrams Resultant force Balanced and Unbalanced forces The gravitational force OR weight Falling down	• What is a force? • What is the unit of force and its symbol? • How do we know when there is a force? • How to we represent forces? • What are the types of forces? • How do we know which forces are present and relevant in any given situation? • How do we represent forces? • What is a free-body diagram? • What is a resultant force? • How is it calculated? • What happens to a body when the forces acting are balanced/unbalanced? • What is the gravitational force/weight? How does it manifest? • Which way does it act? • What is mass? How is it measured? • What is the difference between mass and weight? • How do we determine the weight of an object? • How do we use W = mg? • What is gravitational field strength, g? What is its unit? • What are the factors that affect the size of the gravitational field strength? • What is "weightlessness"? • What is "free fall"? • What is "zero-g"? • How do objects fall on Earth?	• force • newton (N) • contact/non-contact • gravitational force/weight • normal/reaction • friction and air/water resistance • thrust • lift • tension/spring force • buoyancy/upthrust • magnetic force • electrostatic force • strong force • weak force • free-body diagram • centre of mass • resultant force • balanced/unbalanced forces • equilibrium • mass/kilogram • gravitational field strength • weightlessness • free-fall • zero-g • orbit	• Become more aware of how objects physically interact with each other in the natural world • Learn to link concepts to real world scenarios • Learn to recognise variables through their unit(s). • Carry out simple calculations. • Problem-solving • Analysis of more complex situations involving more than one force • Carry out practical work • Collect relevant data in tabular form • Analyse and evaluate experimental results	• Whole class discussion • Pair work • Practical activities • Problem-solving tasks • Watching short video clips • Class and homework worksheets • Research tasks

	Analysis of a parachutist's fall Friction	• What is the effect of air resistance? • What is friction? • What causes friction? • What are the factors that affect friction? • What are the types of friction?	• static and dynamic equilibrium • static and dynamic friction		
Spring Term	Tension The Spring force Hooke's Law	• How do strings behave when a force is applied? • How do springs behave when they are loaded? • What is Hooke's Law? • What is the extension of a spring and how is it calculated? • How to use F = kx? • What happens when springs are loaded beyond their limit of proportionality? • How to find the spring constant from a graph?	• extension (of a spring) • spring constant • gradient • limit of proportionality • elastic region • elastic limit • plastic region	• Handle simple equations to solve for the variable they are after. • Learn to recognise variables through their unit(s). • Carry out simple calculations. • Problem-solving • Analysis of more complex situations involving more than one force • Carry out practical work • Collect relevant data in tabular form • Analyse and evaluate experimental results • Determine the gradient of a graph • Learn how to use graphical information to determine physical quantities • Learn to manipulate equations • Identify situations where certain equations apply • Learn the units of quantities • Use linked equations to solve more complex problems involving speed, acceleration, mass and force. • Use linked equations to solve problems involving energy, work done and power.	
	Identical springs in series and parallel	• What is the new spring constant of a system of identical springs connected in series and parallel?			
	MOTION Speed Average speed	• What is speed? • How is it calculated? • What is average speed? • In which situations does it make sense to used average speed?	• speed • constant speed • average speed • gain in speed		
	Acceleration	• What is acceleration? • How is acceleration calculated for an object whose speed increases steadily? • What is its unit?	• acceleration • distance travelled		
	Force and acceleration	• How is force linked to acceleration? • How to use F = ma?			
	WORK AND ENERGY Types of energy Kinetic and potential energy Energy conversions	• What is energy? • What are the main types of energy? • What are energy transfers? What energy transfers take place in real life situations? • What is kinetic energy? • What is potential energy? • What is the principle of conservation of energy?	• energy • potential • kinetic • energy conversions • conservation of energy		
	Work done	• What is work done? What is its unit?	• work done • joule (J) • power • watt (W)		

		• How is work done calculated? • How do you use W = Fd? • How does work done link to kinetic and potential energy?		• Independent learning	
	Energy Resources	• What types of energy resources are there? • Which energy sources are renewable / non-renewable? • How do we generate electricity? • What are the advantages and disadvantages of the various type of energy resources?	• renewable and non-renewable • fossil fuels • hydroelectricity • wind, tides and tidal barrages, solar, geothermal, water waves, bio-fuel, nuclear • decommissioning • carbon neutral • greenhouse effect		
	Power and efficiency	• What is power and how is it calculated? • What is the unit of power? • How do we calculate efficiency			
Summer Term	WAVES Waves Main types of waves Properties of waves Speed of a wave	• What is a wave? • What is a transverse wave? • What is a longitudinal wave? • What are examples of longitudinal and transverse waves? • What are the main properties/parts of a wave? • How are the main properties of a wave measured? • What is the wave equation? • How do you use the wave equation (v = f λ)?	• wave • longitudinal • transverse • wavelength • amplitude • frequency and time period • hertz (Hz) • compression • rarefaction • wave equation	• Carry out practical work • Collect relevant data in tabular form • Analyse and evaluate experimental results • Determine the gradient of a graph • Learn how to use graphical information to determine physical quantities • Learn to manipulate equations • Identify situations where certain equations apply • Learn the units of quantities • Use linked equations to solve more complex problems • Connect ideas and concepts learned in other sciences/subjects to physics • Draw ray diagrams	
	Waves at a boundary between two media Electromagnetic waves	• What happens when waves hit a boundary/surface? • What is the electromagnetic spectrum? • What are the regions of the electromagnetic spectrum? • What are the dangers and practical applications of each region of the electromagnetic spectrum?	• reflection • absorption • transmission • electromagnetic spectrum		
	Reflection	• What are the rules of reflection? • What are the types of reflection?	• ray diagram • incident ray • reflected ray • angle of incidence • angle of reflection • normal • diffuse reflection • specular reflection		
	Refraction	• What happens when a light ray enters a new medium? • How do the wave fronts change? • What happens to the speed and direction of the wave?	• refraction • angle of refraction		

	Images formed by convex and concave lenses Sound waves	• What is a convex lens? • How do light rays get transmitted through a lens? • How does one draw ray diagrams? • What images form with a convex lens? • What images form with a concave lens? • What is the magnification of a lens? • What are the applications of convex and concave lenses? • How does one use the magnification equation? • What are sound waves? • How do we hear? What is the structure of the ear? • What is the speed of sound in air and in other materials? • What is ultrasound and what are its applications? • What are seismic waves?	• refracted ray • wave front • concave lens • convex lens • axis • principal focus • focal length • virtual ray • real/virtual image • magnification • ultrasound • ear drum • medical imaging • industrial imaging • seismic waves/earthquakes • P and S waves		

Equipment needed for lessons	How will learning and progress be assessed?
• Standard school stationery • Exercise book • Calculator • 30-cm ruler • protractor • Glue stick	• End of unit tests (subject knowledge focus) • Formal assessment week (May) • Peer and self-assessment • Homework tasks (often worksheets with problems and exam style questions) • Independent study • Retrieval practice activities

Extension & Enrichment opportunities	What can you do to support your child?
• Weekly lunchtime Physics Drop-In sessions • There is a wide range of youtube videos that address many topics. Here is a small sample: • Cognito – Types of forces https://www.youtube.com/watch?v=WCPTKRaScgE • Quick Science- W = mg • https://www.youtube.com/watch?v=IaZt1gQ4P64 • Physics Online – Friction • https://www.youtube.com/watch?v=5AJVlt6o6Yc • Five minute physics • https://www.youtube.com/watch?v=0QFihMlKnVE	• Where possible, provide a quiet space for your child to carry out homework and study for exams • Provide support with organisation (e.g. ensuring homework is completed on time, bringing correct equipment for lessons). • Encourage your child to read their notes and go through the sample questions done in class before attempting their homework. • Encourage them to read the appropriate sections of the textbook and attempt extra questions for practice and consolidation. • Get them to proactively seek help by attending Physics Drop-In if they are stuck or they are unsure about any aspect of the work. • Discourage the use of equation triangles. They are a poor shortcut. Unlike maths, physics is about how quantities are related to each other. Equation triangles do not address this. Instead promote good algebra skills and a deep understanding of the concepts.

Inclusion	Inclusion within Y9 Physics
• Teachers follow student passports to ensure that the needs of all students with SEND are met. • Work is enlarged to the necessary size for visually impaired students. • Teachers will ensure that classrooms are quiet learning environments where possible and will dim lights to support students with sensory needs. • Students have the use of laptop if they have a SEND need whereby use of a laptop supports them. • Hearing impaired students are supported through use a radio aid and teachers ensure that students can lip read at all times during lessons. • Dyslexic students are encouraged to use coloured overlays when they are required to read long passages. • Use of dyslexic friendly fonts and coloured backgrounds used in PowerPoints/resources. • Students with ADHD are given movement breaks, fidget toys and lessons are 'chunked' to aid concentration. • Students are seated according to their needs, students work with the SENDCo to decide upon this.	• For pupils with visual impairment, enlarged graph paper for plotting graphs during experiments will be available. • For upper body physical impairment, pupils are allowed to photocopy or take photographs of a classmate's exercise book. A word processor is not always a practical option for labelled diagrams, drawing apparatus or drawing graphs. • Where possible we amend practical equipment or provide a magnifying glass to view instruments. • Videos shown with subtitles. • Some laboratories have height-adjustable benches for wheelchair access

If you have any questions about this Learning Overview, please contact the named Teacher above.