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

Subject:	Physics	**Lead Teacher:**	Dr M S Catalan	**Year:**	10

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	Units and Measurement	• When should standard form be used? • How are significant figures used in physics/science? • What are the SI base units? • What are derived units? • What are prefixes? • What is a method for converting units? • How does one measure mass, length, volume and time accurately? • What is Vernier calliper and how is it used? • What is a micrometer and how is it used to make measurements? • What is density? • How is the density of an object/substance determined?	• standard form/scientific notation • significant figures • base unit • derived units • metre, second, kelvin, ampere, mole, kilogram, candela • prefixes (Tera, Giga, Mega, liko, centi, milli, micro, nano, pico) • Vernier calliper • micrometer • displacement can • volume • density	• Numeracy • Convert units • Carry out simple calculations. • Problem-solving • Analysis of more complex situations involving more than one force • Set-up and carry out practical work • Techniques for making accurate measurements of length, mass, time, volume • Make accurate measurements of small lengths using Vernier callipers and micrometers	• Whole class discussion • Pair work • Class demonstrations • Required practical activities • Problem-solving tasks • Watching short video clips • Class and homework worksheets • Research tasks
	Graphs and Vectors	• What are the characteristics of a perfect line graph? • What is a good line of best fit? • What is interpolation and extrapolation? • How is the gradient calculated? • What physical quantity does the gradient represent? What is its unit? • What is the relationship between the plotted quantities? • What techniques exist for the interpretation of curved graphs such as inverse relationships? Which quantities are vectors and which scalars? • What is a scaled vector diagram? • How are vectors added? • How are vectors used to solve a range of problems?	• line graph • x/horizontal axis • y/vertical axis • gradient • directly proportional • inverse proportionality • interpolation • extrapolation • inverse square law • vectors • scalars • parallelogram method • head-to-tail method • scale diagram	• Collect relevant data in tabular form • Analyse and evaluate experimental results • Plot, interpret and extract physical information from graphs • Draw scaled diagrams of vectors • Analyse and interpret vector diagrams • Independent study	

	Space Physics	• How do stars form and evolve? • What are the final stages of stellar evolution for stars the size of the Sun and much larger than the size of the Sun? • What objects make up the solar system? • What is an orbit? What is the relationship between orbital speed and radius of orbit? • What is the big bang theory?	• nebula, protostar • main-sequence star • planetary nebula • red giant • white dwarf • neutron star • black hole • solar system • planets, dwarf planets, satellites • big bang		
Spring Term	Dynamics and Road Safety	• What is the difference between distance and displacement? • What is the difference between speed and velocity? • What is motion in one dimension? • What is average velocity? • What is (constant) acceleration? • What does the gradient of a distance/displacement time graph represent? • What does the gradient and area of a velocity-time graph represent? • How is the gradient of a curved line found? • How is the area under a curved graph found? • How do we use graphs to interpret motion? • How do we draw displacement-time and velocity-time graphs for an object in motion? • What are equations of motion? • How and when does one apply the equations of motion? • How is reaction time determined? • How is the gravitational field strength found? • What happens in 2-dimensional motion? • What is stopping distance? • What is thinking time? • What is thinking distance? • What is braking distance? • What are the factors that affect thinking and braking distance?	• displacement and distance • speed and velocity • equations of motion (SUVAT) • constant acceleration • two-dimensional motion/projectile motion • reaction time • gravitational field strength • stopping distance • thinking distance • thinking time • braking distance	• Handle simple equations to solve for the variable they are after. • Learn to recognise variables through their unit(s). • Carry out 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.	

	Newton's Laws and Momentum	• How does one interpret/draw graphs on stopping, thinking and braking distance? • How do we use equations of motion to solve car safety problems? • What are all the types of forces (recall from yr9)? • What is a free-body diagram and how is it used? • What is a physical law? • What are Newton's Laws of motion? • What is the law of inertia? • What is resultant force? • When and how is F = ma applied? • Which forces form action-reaction pairs in real-life situations? • In which real-life situations do Newton's laws apply? • What is momentum? How is it measured? • What is change in momentum / impulse? • How are vectors applied to find impulse? • What is the link between change in momentum, force and time? • What is the link between momentum and collisions? • What is conservation of momentum? • What are applications of conservation of momentum? • How are these concepts applied to solve problems on momentum and conservation of momentum? • What are the types of collisions?	• physics laws • inertia • free-body diagram • resultant force • action-reaction • momentum • impulse • conservation of momentum • explosions • collisions • elastic and inelastic collisions	• Independent learning • Handle key terminology	

Summer Term	Effects of forces: Turning moment of a force Centre of mass and stability Simple machines Pressure Pressure in solids Pressure in fluids Pressure in gases Thermal Physics	• What is the turning moment or the turning effect of a force? • What are the factors that affect the turning moment? • What is the rule of moments? • What are examples of problems on moments? • What is centre of mass? • How is the centre of mass determined? • What are the types of stability? • What is a lever? • What are examples of levers? • How do ideas on levers apply to gears? • What is pressure and what is its unit? • How is pressure in solids determined? • What factors affect pressure in a fluid? • What is atmospheric pressure? • What are the real-world applications of these concepts? • What is upthrust or buoyancy? • What causes upthrust and how is this linked to pressure? • What laws govern the behaviour of gases? • How is pressure exerted on the walls of a container? • How is PV = constant used to solve problems on gases? • What is a hydraulic system and what are its applications? • What is internal energy? • What is specific heat capacity? • How is specific heat capacity experimentally found? • What is specific latent heat? • What are the main features of a temperature-time graph?	• line of action of force • clockwise / anticlockwise moment • turning effect • equilibrium • centre of mass • line of action of weight • plumbline • levers • pivot /fulcrum • load and effort • gears • pressure • atmospheric pressure • upthrust • buoyancy • gas laws • collisions • change in momentum • Hooke's Law • extension • hydraulic systems • incompressible fluid • specific heat capacity • specific latent heat • states of matter • physical change • breaking bonds • internal energy • solid, liquid, gas • freezing, melting • condensing, • evaporating • sublimating	• 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 • Independent study • Use key terminology to explain concepts	

		• What are the methods of heat transfer? • What is conduction? • How is knowledge on conduction used to reduce energy loses in a home? • What is convection? • What is radiation? • What are examples of applications of conduction, convection and radiation? • How does one investigate conduction and radiation?	• conduction • vibration/collisions • free electrons • cavity wall • cavity wall and loft insulation • double glazing • draught proofing • convection • radiation • infrared		

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 (mostly worksheets with problems and extended answer questions) • Independent study • Retrieval practice activities

Extension & Enrichment opportunities	What can you do to support your child?

• Trip: Science Live GCSE
• Extended reading: New Scientist, Scientific American, and an engineering journal Ingenia, available to loan (outside technician's prep room)
• There are a wide range of youtube videos that offer extra support for Higher Tier. Below are some examples:
  • FreeScienceLessons https://www.youtube.com/watch?v=ZtQhlwPxE28
  • GCSE Physics Online
  • https://www.youtube.com/watch?v=oZpvGs2-Xyk
  • https://www.youtube.com/watch?v=UyeFNz7sHYg
  • Isaac Physics
  • https://www.youtube.com/watch?v=4yHntvCfAVs
	• Provide a quiet space for your child to carry out homework and study for exams
	• Provide support with organisation where possible (e.g. help ensure homework is completed on time and that they bring correct equipment to lessons).
	• Encourage your child to proactively seek help if they are unsure about any aspect of the work (eg. by attending weekly Physics Drop-In).
	• Encourage them to read the appropriate sections of the textbook and attempt the questions in the textbook for practice and consolidation.
	• Discuss whether they would benefit from extra study aids such as revision books, revision cards or extra practice questions booklets.

Inclusion	Inclusion within Y11 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.