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

Subject:	Physics	**Lead Teacher:**	Dr M S Catalan	**Year:**	11

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	Static Electricity and Electric Fields Circuits	• What is an insulator/conductor? • What is static electricity? • What is the charge of an electron/proton? What is the unit of charge? • How are conductors and insulators charged? • What is charging by induction? • What are the rules of attraction and repulsion between charged objects? • What is sparking? • What are the applications and dangers of static electricity? • What is an electric field? • What is the shape and properties of the electric field around charged objects? • How does a field relate to the concept of force? • What are the electrical circuit symbols? • How does one draw / interpret a circuit diagram? • What is current? How is it measured? (Q=It) • What is potential difference (p.d.)? What is its unit? • How does one apply the equations Q = It and E=QV? • How and where should an ammeter and a voltmeter be connected in a circuit? • How does one connect a circuit based diagram? • What is a series/parallel circuit? • What are the rules for calculating current and	• insulator • conductor • static charge • positively/negatively charged • (free) electrons • electrostatic attraction/repulsion • induction • van de Graaf generator • spark(ing) • electric shock • polythene rod • (electric) field • current • conventional current • electron current • amp • potential difference • volt • voltmeter, ammeter, ohmmeter, multi-meter • positive/negative terminals • bulb OR lamp, switch, wires, cell, battery, power supply, diode, bell, fuse, resistor, variable resistor (rheostat) • light emitting diode (LED) • light dependent resistor (LDR) • thermistor • transformer • series • parallel • cross-section(al) area • power	• Numeracy • Problem-solving • Analytical skills • Evaluative skills • Higher level experimental skills e.g. setting up circuits independently • Ability to apply experimental techniques and graphical skills to collect accurate results and interpret results using a scientific framework. • Solve higher level synoptic problems (grade 8/9) that require the application of concepts across various topics from this and previous years. • Independent learning	• Whole class discussion • Pair work • Class demonstrations • Required practical activities • Problem-solving tasks • Watching short video clips • Class and homework worksheets • Independent learning

		p.d. in series and parallel circuits? • What is and what causes electrical resistance? • What is the relationship between resistance and current? • What is the relationship between the length of a wire and resistance (and current)? • What is the relationship between cross-sectional area of a wire and resistance (and current)? • What is a resistor? • How is total resistance determined in series and parallel circuits? • What is the relationship between the resistance of a component and the p.d. across it? • What does the equation V = IR mean and how is it used? • What is power in circuits? ($P=E/t = IV= I^2R = V^2/R$) • How are the equations used together to solve more complex circuit problems?			
Spring Term	IV Characteristics of conductors	• What is an I-V characteristic graph? • What is an ohmic/non-ohmic conductor? What is Ohm's Law? • What is a rheostat? How is it used to vary resistance and current in a circuit? • How should components be connected to determine the IV characteristic of a conductor? • What are the shapes of the IV graphs for a resistor, a filament lamp and a diode? • What does each graph say about the resistance of the component as p.d. increases and why? • What are LDRs? • What is the relationship between resistance and light intensity for an LDR? • What are thermistors?	• I-V characteristic • ohmic/non-ohmic conductors (Ohm's Law) • rheostat or variable resistor • light emitting diode (LED) • light dependent resistance (LDR) • thermistor • alternating current (AC) • direct current (DC) • alternating current (AC) • three-cored cable • neutral wire, live wire, earth wire	• Numeracy • Problem-solving • Analytical skills • Evaluative skills • Higher level experimental skills e.g. setting up circuits independently • Ability to apply experimental techniques and graphical skills to collect accurate results and interpret results using a scientific framework. • Solve higher level synoptic problems (grade 8/9) that require the application of concepts across various topics from this and previous years.	

	Electricity in the Home Magnetism Electromagnetism Electromagnetic induction	• What is the relationship between resistance and temperature for a thermistors? • How are LDRs and thermistors used in sensor circuits? • What is alternating current (AC) and direct current (DC)? • What is in a three-core cable? • What is a magnetic field? • What are magnetic materials? • What are the rules of attraction and repulsion • What is a domain? • What is the difference between a magnetic material and a magnet? • What is induced magnetism? • What is the shape of the magnetic field around a bar magnet? • What is a (plotting) compass and how is it used to determine the magnetic field direction? • What is the shape of the field around a current-carrying wire? • How is the direction of the field determined? • What is the shape of a field around a solenoid with a current? • What are the factors that affect the strength of the field around a solenoid? • What are examples of applications of electromagnets? • What is the motor effect? • What is the magnitude of the force on a conductor in a magnetic field? What factors affect it? (F = BIL) • How is Fleming's left-hand rule to determine the direction of the force? • What are examples of applications of the motor effect? • What is a generator? • What is an induced current? • How do we generate electricity?	• magnetic field • magnetic material • polarity, north and south poles • attraction/repulsions • induced magnetism • permanent/temporary magnetism • plotting compass • electromagnetism • solenoid • right-hand rule • electromagnetic relay • electric bell • motor effect • motors, loudspeakers • electromagnetic induction • induced current • generators • transformers • primary/secondary coil • step-up/down transformers • national grid		

		• What are other applications of electromagnetic induction? • What is a transformer? • How is p.d. and current in the primary coil related to the secondary coil? • What is a step up/down transformer? • What is the national grid?			
Summer Term	Nuclear physics	• What is radioactivity? • What are the three types of radioactive decay? • How are these decays represented in decay equations? • What are the properties of the different decay particles? • What is the activity of a source? • What is the half-life of a source and how is it calculated? • What are the risks and uses of radiation? • What is irradiation and contamination? • What is background radiation? • What is nuclear fission/fusion? • What is a chain reaction?	• seismic waves • isotope • radioactive decay • alpha, beta, gamma decay • activity of a radioactive source • half-life • background radiation • irradiation • contamination • nuclear fission/fusion • chain reaction	• Numeracy • Problem-solving • Analytical skills • Evaluative skills • Higher level experimental skills e.g. setting up circuits independently • Ability to apply experimental techniques and graphical skills to collect accurate results and interpret results using a scientific framework. • Solve higher level synoptic problems (grade 8/9) that require the application of concepts across various topics from this and previous years.	

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 extended questions) • Independent study • Retrieval practice activities

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

• Extended reading: New Scientist, Scientific American, and an engineering journal Ingenia, available to loan (outside technician's prep room)
• Higher Tier 9-1 past papers for practice can be found at: https://www.aqa.org.uk/subjects/science/gcse/physics-8463/assessment-resources OR https://www.savemyexams.co.uk/gcse/physics/aqa/-/pages/past-papers/
• There are a wide range of youtube videos that offer extra support for Higher Tier. Below are some examples:
Physics Online
  • https://www.youtube.com/watch?v=WtPeQsEwEWA
  • Isaac Physics
  • https://www.youtube.com/watch?v=A3ScQOMy4fg&list=PLmFthZ_IoSnefUuwpEU-_qPJ0QkYMcua9&index=4
	• Encourage your child to proactively seek help when 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 extra questions for practice and consolidation.
	• Discuss whether they would benefit from having extra study aids -a revision guide or revision cards, such as those available from CGP.

Inclusion	**Inclusion in Year 11 Physics**
• All teachers read the individual student passports and SEND requirements. • Teachers will make reasonable adjustments and adapt aspects of their teaching delivery to accommodate viable changes and modifications to allow all pupils to access the subject content. • Exams access - We follow the JCQ guidelines on access in unit tests, end-of-year assessments and mock examinations. • Light sensitivity – students can wear coloured glasses in lessons to reduce glare • Visual impairment – sat in front, larger fonts where possible or magnified photocopies if the article/activity is not available for modification digitally • Hearing impairment – sat in front or where student passport suggests is the best position • Physical impairment – student can under certain circumstances be allocated a word processor. They can also photocopy of classmate's notes, take photos of a classmate's notes to print, change classrooms for mobility or room access • Dyslexia – Word processor as advised by school SEND coordinator • ADHD – Movement breaks, fidget toys • Autism spectrum – clear and logical set of instructions, writing homework on the board, use of ear defenders	• 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.