AQA GCSE Physics – Trilogy & Separate Year 10 Curriculum Map

Notre Dame Catholic College

YEAR 10	Autumn Term 2	Spring Term 1	Spring Term 2 and Summer Term 1	Summer Term 2
Curriculum Content	**Composite 2: Electricity** **Understand the basics of Electricity how is it supplied to domestic users.** **Component 1**: draw and interpret circuit diagrams, identify different types of circuit and describe some of the key features of each type of circuit. **Component 2**: Describe electric flow and calculate charge flow. **Component 3:** Describe the features of a series circuit and identify the current, potential difference and resistance rules for a series circuit. **Component 4:** Describe the features of a parallel circuit and identify the current, potential difference and resistance rules for a parallel circuit. **Component 5:** distinguish between current and potential difference and investigate factors that affect resistance in a circuit. **Component 6: Required Practical 3:** Use circuit diagrams to set up and check appropriate circuits to investigate the factors affecting the resistance of electrical circuits. **Component 7:** explain that, for some resistors, the value of R remains constant but that in others it can change as the current changes. **Component 8:** explain the design and use of a circuit to measure the resistance of a component by measuring the current through, and potential difference across, the component. **Component 9:** Use graphs to explore whether circuit elements are linear or non-linear and relate the curves produced to their function and properties. **Component 10: Required Practical 4:** use circuit diagrams to construct appropriate circuits to investigate the I–V characteristics of a variety of circuit elements, including a filament lamp, a diode and a resistor at constant temperature. **Component 11:** explain how electricity is transmitted to homes and the features of mains electricity and explain the difference between direct and alternating potential difference. **Component 12:** investigate power and energy transfers and calculate power. **Component 13**: describe the features of the national grid and explain why step-up and step-down transformers are used. **Composite 2: Electricity – Static Electricity SEPARATES only** **Understand how static electricity is produced and various applications that use static electricity.** **Component 14:** describe the production of static electricity, and sparking, by rubbing surfaces **Component 15:** describe evidence that charged objects exert forces of attraction or repulsion on one another when not in contact	**Composite 3: Particle Model of Matter** **Understand Particle model of Matter and the role of particles when thinking about density, changes between states of matter, pressure and volume.** **Component 1**: recognise/draw simple diagrams to model the difference between solids, liquids and gases and explain the differences in density between the different states of matter in terms of the arrangement of atoms or molecules. **Component 2: Required practical activity 5:** use appropriate apparatus to make and record the measurements needed to determine the densities of regular and irregular solid objects and liquids. **Component 3:** describe and apply their understanding of particle behaviour to the energy in closed systems of solids, liquids and gases with a particular focus on internal energy, specific heat capacity and latent heat. **Component 4:** develop own models of microscopic particle motion to understand some macroscopic behaviours. **Component 5**: describe the effects of latent heat in exploring, both qualitatively and quantitatively, how matter changes state from one phase to the other. **Component 6**: explain the fundamental theory behind the gas laws. **Component 7**: analyse basic particle theory as well as thinking and investigating how pressure affects volume and how temperature affects volume, while solving problems for both relationships. **Composite 3: Particle Model of Matter – Pressure in Gases SEPARATES only** **Understand Particle model of Matter and the role of particles when thinking about density, changes between states of matter, pressure and volume.** **Component 8:** use the particle model to explain how increasing the volume in which a gas is contained, at constant temperature, can lead to a decrease in pressure. **Component 9:** calculate the change in the pressure of a gas or the volume of a gas (a fixed mass held at constant temperature) when either the pressure or volume is increased or decreased. **Component 10:** explain how, in a given situation e.g. a bicycle pump, doing work on an enclosed gas leads to an increase in the temperature of the gas.	**Composite 4: Atomic Structure** **Understand Atomic Structure and the historic changes.** **Component 1:** describe the current model of the atoms, and how ideas about the structure of the atom have changed over the years. **Component 2:** relate differences between isotopes to differences in conventional representations of their identities, charges and masses. **Component 3**: describe the three types of ionising radiation and consider hazards related to and uses of each type of radiation. **Component 4:** apply their knowledge to the uses of radiation and evaluate the best sources of radiation to use in a given situation. **Component 5:** recall examples of radioactive decay and use the names and symbols of common nuclei and particles to write balanced equations that show single alpha (α) and beta (β) decay. **Component 6:** explain the concept of half-life, determine half-life from given information and calculate the net decline, expressed as a ratio, in a radioactive emission after a given number of half-lives. **Component 7:** compare the hazards associated with contamination and irradiation and describe suitable safety precautions. **Component 8:** understand that it is important for the findings of studies into the effects of radiation on humans to be published and shared with other scientists so that the findings can be checked by peer review. **Composite 4: Atomic Structure - Hazards and uses of radioactive emissions and of background radiation, and nuclear fission and fusion SEPARATES only** **Component 9**: explain why the hazards associated with radioactive material differ according to the half-life involved. **Component 10:** describe and evaluate the uses of nuclear radiations for exploration of internal organs, and for control or destruction of unwanted tissue. **Component 11:** evaluate the perceived risks of using nuclear radiations in relation to given data and consequences.**Component 12:** explain the process of nuclear fission and fusion and describe the fusion process in stars and the production of electricity in a power station using nuclear fission.	**Composite 5: Forces Part 1** **Understand what forces are and how they interact with objects.** **Component 1**: recall example of scalar and vector quantities and define both. **Component 2**: Identify contact and non-contact forces. **Component 3:** calculate work done and power and how they are useful in different ways. **Component 4:** describe the interaction between pairs of objects which produce a force on each object and recall Newton's three laws of motion. **Component 5**: describe examples of the forces acting on an isolated object or system and use free body diagrams to describe qualitatively examples where several forces lead to a resultant force on an object, including balanced forces when the resultant force is zero. **Component 6:** Convert between newton-metres and joules and apply the equation linking work done, force and distance. **Component 7**: describe the difference between elastic deformation and inelastic deformation caused by stretching forces and calculate the work done in stretching a spring. **Component 8: Required Practical 6**: investigate the relationship between force and extension for a spring. **SEPARATES only:** **Component 9**: Describe the turning effect of a force and how forces affect the pressure in solids, liquids and gases. **Component 10:** calculate pressure in a fluid. **Component 11:** explain why, in a liquid, pressure at a point increases with the height of the column of liquid above that point and with the density of the liquid. **Component 12:** calculate the differences in pressure at different depths in a liquid and describe the factors which influence floating and sinking. **Component 13:** describe a simple model of the Earth's atmosphere and of atmospheric pressure. **Component 14:** explain why atmospheric pressure varies with height above a Surface. **Composite 5: Forces Part 2** **Forces and Motion** **Component 15:** apply Newton's three laws of motion and interpret distance-time graphs and velocity-time graphs. **Component 16:** calculate stopping distances and evaluate the effect of various factors on thinking distance based on given data. **Component 17:** explain the factors which affect the distance required for road transport vehicles to come to rest in emergencies, and the implications for safety. **Component 18:** explain the dangers caused by large decelerations and estimate the forces involved in the deceleration of road vehicles in typical situations on a public road. **Component 19:** calculate momentum and describe and explain examples of momentum in an event, such as a collision. **SEPARATES only:** **Component 20:** complete calculations involving an event, such as the collision of two objects. **Component 21:** explain safety features such as: air bags, seat belts, gymnasium crash mats, cycle helmets and cushioned surfaces for playgrounds with reference to the concept of rate of change of momentum.

	Component 16: explain how the transfer of electrons between objects can explain the phenomena of static electricity draw the electric field pattern for an isolated charged sphere **Component 17:** explain the concept of an electric field and how the concept of an electric field helps to explain the non-contact force between charged objects as well as other electrostatic phenomena such as sparking.			**Component 22:** apply equations relating force, mass, velocity and acceleration to explain how the changes involved are inter-related.
Prior knowledge and skills (from previous year / key stage)	Students should be able to draw and identify circuit components and should also be able to compare the differences between series and parallel circuits. Students should understand the structure of the plug and how to calculate electrical power.	Students should understand how the national grid transmits energy around the UK. Students should be able to use the particle theory to explain changes in state and identify solids, liquids and gases. Students can recall and use the density equation. Students can explain the internal energy changes when particles change state.	From KS3 chemistry, students should recognise the structure of the atom and each type of particle and their properties. From KS3/KS4 chemistry, students should be able to describe the history of the model of the atom and explain why there are various models and theories. Students should be able to recognise expressions given in standard form.	Students will recognise forces as contact or non-contact. Students should recognise and be able to use the symbol for proportionality. Students should be able to recall the equation linking mass and gravity and apply the equation to problems solving forces.
Core Knowledge Organiser content	Electricity Series and parallel circuits Electrical power	The National Grid Static Electricity and charge Particle model of matter States and changes of matter Density and pressure Gas Pressure Hydraulics	Atomic structure radiation	Forces and their effects Forces and motion Momentum Motion graphs Resolving vectors
Assessment Components	**AO1:** Demonstrate knowledge and understanding of: 1) scientific ideas 2) scientific techniques and procedures. **AO2:** Apply knowledge and understanding of: 1) scientific ideas 2) scientific enquiry, techniques and procedures. **AO3:** Analyse information and ideas to: 1a) interpret 1b) evaluate 2a) make judgements 2b) draw conclusions 3a) develop experimental procedures 3b) improve experimental procedures.	**AO1:** Demonstrate knowledge and understanding of: 1) scientific ideas 2) scientific techniques and procedures. **AO2:** Apply knowledge and understanding of: 1) scientific ideas **AO3:** Analyse information and ideas to: 1a) interpret 1b) evaluate 2a) make judgements 2b) draw conclusions 3a) develop experimental procedures 3b) improve experimental procedures.	**AO1:** Demonstrate knowledge and understanding of: 1) scientific ideas 2) scientific techniques and procedures. **AO2:** Apply knowledge and understanding of: 1) scientific ideas 2) scientific enquiry, techniques and procedures. **AO3:** Analyse information and ideas to: 1a) interpret 1b) evaluate 2a) make judgements 2b) draw conclusions 3a) develop experimental procedures 3b) improve experimental procedures.	**AO1:** Demonstrate knowledge and understanding of: 1) scientific ideas 2) scientific techniques and procedures. **AO2:** Apply knowledge and understanding of: 1) scientific ideas 2) scientific enquiry, techniques and procedures. **AO3:** Analyse information and ideas to: 1a) interpret 1b) evaluate 2a) make judgements 2b) draw conclusions 3a) develop experimental procedures 3b) improve experimental procedures.
Vocabulary / Key Subject Terminology	**Diode, light-dependent resistor, resistance, current, charge, potential difference, series, parallel, thermistor, direct current, alternating current, transformers, oscilloscope**	**Static electricity, discharge, density, internal energy, latent heat, physical change, pressure, specific latent heat of fusion, specific latent heat of vaporisation, gas pressure, hydraulics**	**Radiation, isotopes, alpha, beta, gamma, ionising, Geiger counter, becquerels, half-life, irradiated, contaminated, atomic number, mass number**	**Scalar, vector, displacement, free-body force diagram, friction, magnitude, terminal velocity, parallelogram of forces, acceleration, deceleration, gradient, tangent, conservation of momentum, inertia, limit of proportionality, weight**
Assessment 1	QWC and Assessed Homework	QWC and Assessed Homework	QWC and Assessed Homework	QWC and Assessed Homework
Assessment 2	Mini Quiz	Mini Quiz End of Unit Test	Mini Quiz	Mini Quiz End of Unit Test

Cross Curricular Links with other Faculties				
Extra-Curricular Offer				
Time Allocation				