Physics Curriculum Overview - Year 11 - Triple

Unit	Details
Electricity	In this chapter pupils will describe the structure of an atom in terms of charged particles and the process of charging by friction resulting in ions and the transfer of electrons. This leads to the concept of an electric field surrounding charged objects causing attractive or repulsive forces between them. Using the definitions of current and voltage, pupils will investigate resistance using Ohm's law and construct series and parallel circuits to learn how current and potential difference operate in them and how these variables are measured with ammeters and voltmeters. Pupils will then investigate resistance of combinations of resistors as well as how current varies with voltage for fixed resistors, filament bulbs and diodes. Finally, pupils will experience the function of light dependent resistors and thermistors and consider their important uses. As a real world application of electric circuits, pupils will study the difference between a.c and d.c. and link this to the mains supply. They will see how a.c. is represented on an oscilloscope and the frequency of the mains will be measured. Pupils will learn how to wire a 3 pin plug and what the colour coding and function is for the three wires. There will be a link to the energy unit as the power and efficiency of electrical devices is calculated and the unit will conclude with the study of the parts and functions of the national grid system. Prior learning: electricity units in Year 6 and in Year 8.
Magnetism and Electromagnetism	Pupils begin this chapter by reinforcing their knowledge of magnetism by looking at the magnetic fields around permanent magnets and the concept of induced magnetism in some materials. Pupils will be reminded of the techniques used to plot a magnetic field and the shape of the Earth's field. Pupils then move on to examine the magnetic field produced by a current and investigate the factors that affect the direction and strength of this field. They compare the field shape of a solenoid to that produced by a simple bar magnet. Building on this understanding *GCSE Physics* pupils investigate the factors affecting the strength of an electromagnet before moving on to describe how these devices can be used in a variety of devices. All higher-tier pupils describe how a current carrying wire placed in a magnetic field would experience the motor effect before going on to explain how this effect could be used to create an electric motor. The force produced on the motor is linked mathematically to the magnetic flux density of the magnetic field. Only those studying *GCSE Physics* at higher level look at the generator effect and the factors which affect the current induced in a wire as it is moved through a magnetic field. These concepts are applied to the design of a practical generator and the a.c. waveform produced as the coil in the generator rotates. Higher-tier GCSE Physics pupils also describe the operation of a transformer in terms of changes in magnetic fields before constructing a practical transformer. The transformer is linked to changes in potential difference along with a discussion of transformer efficiency. Finally, pupils describe the application of transformers in the National Grid to include calculations on step up and step down transformers. Prior learning: materials Year 5, forces Year 5, forces Year 7