Physics Curriculum Overview - Year 9 - Triple

Unit	Details
Particle model of matter	Pupils will increase their understanding of density by measuring and calculating the density of solids and liquids. This will lead to studying the three states of matter, their properties and what happens during a change of state. The changes in the properties of matter will be used to introduce the kinetic theory and to analyse the changes in temperature occurring during heating and the concept of latent heat. Pupils will move on to look at the concept of internal energy in detail. They will describe and calculate latent heat of fusion and vaporisation. Pupils will then analyse the relationships between the pressure and temperature of a fixed mass of gas. They will be able to describe the cause of pressure and explain the changes in pressure in terms of changes in the motion of the gas particles as the temperature decreases. Finally, pupils will investigate the relationship between gas pressure and volume. Higher level pupils will note that work was done during the compression of a gas and this can have a heating effect.
Energy resources	Pupils will examine different sources of energy used to generate electricity or provide heating for homes. They will consider the effect of the production and use of biofuels on the environment along with the concept of carbon-neutrality before outlining the use of nuclear power in comparison to fossil fuels. Pupils will describe and evaluate renewable resources and how these can be used to generate electricity. They will compare energy resources in terms of local environmental impacts such as pollution and global environment impacts such as acid rain and contribution to global warming. Finally, the pupils will describe how the different resources could be applied in combination to meet the base load and changing energy demands throughout a single day before finally considering the capital costs and operating cost over the operational lifetime of the resource.
Atomic structure	Pupils will describe the structure of the atom and how experimentation and developments in our understanding of subatomic particles have driven changes in the model used to describe the atom. Pupils will describe the changes in the nucleus which occur during alpha, beta, and gamma decay along with neutron emission in terms of atomic (proton) number and mass number using the appropriate nuclear notation for isotopes. They will be able to describe the properties of alpha, beta, and gamma radiation and the safety requirements when using radioactive materials. Pupils will understand the concepts of activity, count rate, patterns in radioactive decay, and half-life. Higher tier pupils will perform calculations involving the relationship between the initial activity, current activity, and half-life. Pupils will study the application of radioactivity to medical tracers within the body and evaluate the risks and benefits. They will also look at the concepts of both nuclear fission and fusion.
Conservation and dissipation of energy	Pupils will continue to develop their understanding of the energy stores model and the processes through which energy can be transferred. Pupils will learn how to measure work done by a force acting over a distance and how this concept can be used to analyse energy changes in gravitational stores and elastic potential stores using the relevant mathematical relationships. Conservation of energy will also be introduced and they will consider the dissipation of energy during transfers such as those caused by friction or electrical heating, leading to efficiency and its calculation. Finally, the pupils will learn about the concept of power and how power rating can be used to determine total energy change over time.