

Year 11 Physics Course outline

	Students have two lessons per cycle taught by specialist Physics teachers. Homework is set once per cycle.		
	Topic and approximate duration	Key learning areas	Homework Options Students will be guided by the class teacher as to which task to complete (according to target grade)
Autumn Term 1	Topic: Atomic structure	Students will start the atomic structure topic by looking at the development of the model of the atom through the research and experiments of the key scientists involved. They will start with the plum pudding model, then study the gold foil alpha scattering experiment and how it led to the nuclear model, before finally looking at the Bohr model and energy levels. This will lead on to an understanding of why some atoms are unstable and the discovery of radioactivity in the form of alpha, beta and gamma radiation and the nuclear equations for these. Uses of alpha, beta and gamma radiation, as well as the dangers and the dangers of contamination and irradiation will also be studied. Next, students will learn about the random nature of radioactive decay and the concept of half-life. They will learn how to carry out half-life calculations and how to determine half-life from graphs. Students will then go on to learn about background radiation, benefits and risks of using radiation and should be able to describe how different types of radioactive waste are processed and dealt with. They should also be able to explain how radioactive materials are used to generate electricity in nuclear power stations, explaining what happens in nuclear fission. Students also need to be able to describe nuclear fusion.	1: Decay Chain Worksheet 2: Background radiation Worksheet 3: Radioactive Waste Exam Questions 4. Extended writing - explaining a chain reaction 5. Extended writing - comparing fission and fusion
	Nature of landmark assessment	Longer answer question mid topic assessment and short and longer answer questions end of topic assessment	
Autumn term 2	Magnetism	Following on from the atomic structure topic, this term is focused around using electricity and the magnetic fields the electric current creates. Students will initially learn about polarity and magnetic forces, including force calculations ($F = BIL$) and Fleming's Left Hand Rule. Students will then learn about electromagnetism and will predict using Fleming's left hand law, which way a wire will move. This will then lead on to understanding how an electric motor works, their applications and how to increase the rate of rotation.	1. $F = BIL$ calculations 2. Electric motor exam Qs 3. Generator exam Qs 4. Extended writing - explaining the design of a transformer 5. Extended writing - explaining how a transformer works

		Students will then learn about electromagnetic induction and apply this knowledge to understanding how generators work, alternating current (A.C.) and also dynamos. Applications also include microphones (and loudspeakers for separate science students). Finally, students will be able to explain the design and function of transformers and complete transformer formulaic calculations.	6. Extended writing - explaining how a microphone/loudspeaker works 7. Transformer calculations
	Nature of landmark assessment	2 x Physics papers replicating the summer exams covering all content taught from Y9 to date	
Spr g term 1	Topic: Magnetism continued Double topic: Revision	Students will finish off the Magnetism topic focussing on the generator effect.	
	Nature of landmark assessment	Longer answer question mid topic assessment and short and longer answer questions end of topic assessment	
Spr g term 2	Triple topic: Space Double topic: Revision	Students will begin by understanding the celestial bodies which are in our Solar System (Sun, planets, moons, etc.) and also our place within a galaxy, within the Universe itself. Students will understand the forces which apply in space and have caused the Sun and planets to form and also why bodies stay in orbit due to gravity. Students will then apply their knowledge of forces (gravity and fusion pressure) to determine the life cycle of an average star (such as the Sun) and massive stars, they will then be able to explain how the lighter elements (up to iron) and the heavier elements (elements heavier than iron) are formed.	1. Diagram of the solar system 2. Extended writing - describing the solar system 3, Extended writing - describing how the Sun is formed 4. Extended writing - describing the life cycle of an average star and a massive star

		Finally, students will apply their knowledge of waves to red shift, where they will understand how we know the universe is expanding.	
	Nature of landmark assessment	Longer answer question mid topic assessment and short and longer answer questions end of topic assessment	
Sum mer Term 1	Topic: Revision	Students will revise the entire course from year 9 - year 11 in preparation of the Summer exams	