

A Level Year 2 Physics Course outline

Students have eight Physics lessons per cycle taught by two specialist Physics teachers.

Teacher A Autumn term

Term	Topic and approximate duration	Key learning areas	Homework
Autumn term	Periodic motion (8 weeks)	Students will be able to describe and calculate the velocity, acceleration, and forces acting on objects moving in a circular path. Students will describe the features of simple harmonic motion in simple mass-spring systems and simple pendulums and represent it graphically. Students will also investigate forced vibrations and resonance, as well as the effects of damping on oscillations. Required practical 7	Prep and consolidation tasks set through Firefly.
	Thermal physics (5 weeks)	Students will investigate the thermal properties of materials, including specific heat capacity and specific latent heat, and describe how the internal energy is a function of changes in temperature and changes of state. They will describe ideal gases and the concept of absolute zero and be able to calculate the properties of gases described to be ideal. Required practical 8	Prep and consolidation tasks set through Firefly.
	<i>Nature of landmark assessment</i>	Interim will be mostly MCQs. Landmark will be short and long answer questions.	

Teacher B Autumn Term

Term	Topic and approximate duration	Key learning areas	Homework
Autumn term	Gravitational fields (3 weeks)	Students will learn Newton's law of gravitation, and apply it to satellites, moons, and planets. Students will learn how to calculate the gravitational field strength and gravitational potential and use gravitational field lines to illustrate gravitational field strength at a given point near a planetary body. Students will be able to describe the significance of lines of equipotential. Students will be able to calculate escape velocity and describe the principles governing satellites in orbit as well as their uses.	Prep and consolidation tasks set through Firefly.
	Electric fields including capacitance (6 weeks)	Students will learn Coulomb's law, and apply it to charged particles. Students will learn how to calculate the electric field strength and electric potential and use field lines to illustrate electric field strength at a given point near a charged object. Students will be able to describe the significance of lines of equipotential. Students will be able to calculate the trajectories of moving particles in an electric field. Students will describe the properties of parallel plate capacitors, explain and calculate capacitance, and describe the behaviour of a capacitor during charging and discharging. Required practical 9	Prep and consolidation tasks set through Firefly.
	Magnetic fields (4 weeks)	Students will be able to describe and calculate magnetic flux and magnetic flux density. Students will be able to explain the forces that arise when charged particles or a current carrying conductor is placed within a magnetic field. Required practical 10.	Prep and consolidation tasks set through Firefly.
	<i>Nature of landmark assessment</i>	Interim will be mostly MCQs. Landmark will be short and long answer questions.	

Teacher A Spring term

Term	Topic and approximate duration	Key learning areas	Homework
Spring term	Thermal physics (2 weeks)	They will know the assumptions underlying the kinetic theory of gases and will be able to use it to explain the relationship between pressure, volume and temperature of a gas. Students will be able to describe how advances in scientific knowledge are dependent on both theoretical and empirical work.	Prep and consolidation tasks set through Firefly. Thermal assessed homework task.
	<i>Astrophysics (10 weeks)</i>	Describe and explain how reflecting and refracting telescopes work using diagrams and how different types of non-optical telescopes operate. Describe different methods of calculating distances to stars and galaxies including absolute magnitude, apparent magnitude, parsecs and light years. Use Wien's displacement law, and Stefan's law in calculations. Classify stars via their spectra, describe stellar evolution and place stars in their appropriate position on the H-R diagram. Use Doppler shift and Red Shift to study distant stars and calculate how fast they are moving away from us. Use the transit method and Doppler shift to find exoplanets.	Prep and consolidation tasks set through Firefly.
	<i>Nature of landmark assessment</i>	Interim will be mostly MCQs. Landmark will be short and long answer questions.	

Teacher B Spring term

Term	Topic and approximate duration	Key learning areas	
Spring term	Magnetic fields (3 weeks)	Students will learn about electromagnetic induction, Faraday's Law and Lenz's law. Students will gain knowledge of and practical skill in the use of an oscilloscope to measure emf. Required practical 11	Prep and consolidation tasks set through Firefly.
	Nuclear Physics (6 weeks)	Students will learn how knowledge of atomic structure built up over time. Students will describe Rutherford's alpha particle scattering experiment and how it led to the estimation of an atom's nucleus. Students will learn the measuring techniques involved in investigating radioactive decay and the mathematical techniques used to analyse decay data. Students will be able to describe many useful applications of ionising radiation. Students will be able to use diffraction of electrons to measure nuclear radii. Students will use the Einstein's equation $E = mc^2$ to calculate the energy released in nuclear decay, fission and fusion. Students will learn how knowledge of excited states within nuclei can be used in medical diagnoses. Students will learn the principles that govern the operation of a nuclear reactor.	Prep and consolidation tasks set through Firefly.
	Nature of landmark assessment	Interim will be mostly MCQs. Landmark will be short and long answer questions.	

Teacher A Summer term

Term	Topic and approximate duration	Key learning areas	Homework
Summer term	<i>Astrophysics (1 week)</i>	Describe and define Quasars. Describe the Hot Big Bang model of the Universe and the evidence for it.	Prep and consolidation tasks set through Firefly.
	<i>Revision (2 weeks)</i>	Practical skills and data analysis + Year 1 and Year 2 content	Revision
	<i>Nature of landmark assessment</i>		

Teacher B Summer term

Term	Topic and approximate duration	Key learning areas	Homework
Summer term	<i>Revision (3 weeks)</i>	Practical skills and data analysis + Year 1 and Year 2 content	Revision
	<i>Nature of landmark assessment</i>		

