جيمس مدرسة فاونديرز دبي GEMS Founders School DUBAI

Year 12

Subject Physics

High Performance Learning

Term	Date	Focus	Summary	Learning Outcomes
Term 2	02/01/23	Unit 1 Mechanics Unit 2 Electricity	Unit 1 Density Springs and Youngs Modulus practical Unit 2 Retrieval Practice and Feedback	Unit 1 Define Density State the unit of density Measure the density of an object Discuss whether there is any limit to the linear graph of a spring Define the spring constant If the extension of a spring is doubled, calculate how much more energy does it stores Unit 2 Retrieval Practice and Feedback Evaluate your learning of the content explored in Unit 2 to idenitfy your areas of development
	09/01/23	Unit 1 Materials Unit 2 Waves	Unit 1 Springs and Youngs Modulus practical Elastic limits of materials Unit 2 Intro to waves	Unit 1 Relate stress to force, and strain to extension Describe what is meant by the Young modulus. Define tensile. Explain why we bother with stress and strain, when force and extension are more easily measured. Predict whether a metal wire stretched below its elastic limit will return to its original length. Describe what happens when a metal wire is stretched beyond its elastic limit and then unloaded. Compare the deformation of other materials such as rubber and polythene with a metal wire. Unit 2 Explain what is meant by one complete oscillation. Define amplitude, frequency, and period. Use equations for the time period of a simple pendulum and of an object oscillating on a spring. Describe how, in simple harmonic motion, kinetic energy and potential energy vary with displacement. Describe how these energies vary with time if damping is negligible. Describe the effects of damping on the characteristics of oscillations
	16/01/23	Unit 1 Materials Unit 2 Waves	Unit 1 Materials Retrieval practice Unit 2 Wave properties and characteristics	Unit 1 Review of the content to prepare for Retrieval practice. Unit 2 State the circumstances in which resonance occurs. Distinguish between free vibrations and forced vibrations. Explain why a resonant system reaches a maximum amplitude of vibration. Explain the diferences between transverse and longitudinal waves. Define a plane-polarised wave. Describe a physics test that can distinguish transversewaves from longitudinal waves. Explain what is meant by the amplitude of a wave. Explain what is meant by the wavelength of a wave. Calculate the frequency of a wave from its period.
	23/01/23	Unit 1 Radioactivity Unit 2 Waves	Unit 1 Intro to Particles Unit 2 Wave characteristics and superposition	Unit 1 Describe what is insidean atom. Explain the term isotope. Represent different atoms State what keeps the protons and neutrons in a nucleus together. Explain why some nuclei are stable and others unstable. Describe what happens when an unstable nucleus emits an alpha particle or a beta minus particle. Recall what is meant by a photon. Calculate the energy of a photon. Estimate how many photons a light source emits every second. Unit 2 Explain what causes waves to refract when they pass across a boundary. Demonstrate the direction light waves bend when they travel out of glass and into air. Explain what we mean by diffraction. Explain how two waves combine to produce reinforcement. Describe the phase difference between two waves if they cancel each other out. Explain why total cancellation is rarely achieved in practice. Describe the necessary condition for the formation of a stationary wave. Deduce whether a stationary wave is formed by superposition. Explain why nodes are formed in fixed positions.
	30/01/23	Unit 1 Radioactivity Unit 2 Waves	Unit 1 Particles and Antiparticles Unit 2 Standing waves	Unit 1 Define antimatter. Describe what happens when a particle and its antiparticle meet. Discuss whether anti-atoms are possible. Unit 2 Explain what condition must be satisfied at both ends of the string. Describe the simplest possible stationary wave pattern that can be formed. Compare the frequencies of higher harmonics with the first harmonic frequency. Describe how an oscilloscope can be used. Interpret waveforms on an oscilloscope to give peak voltage and wavelength. Explain the principles of the generation and detection of ultrasound waves using piezo-electric transducers. Explain the main principles behind the use of ultrasound to obtain diagnostic information about internal structures. Define specific acoustic impedance and explain the importance in relation to the intensity reflection coefficient at a boundary.
	06/02/23	Unit 1 Radioactivity Unit 2 Waves	Unit 1 Particles and Antiparticles retrieval practice Unit 2 Waves (chapter 11) retrieval practice	Unit 1&2 Retrieval Practice and Feedback Evaluate your learning of the content explored in Unit 2 to idenitfy your areas of development
	13/02/23			
	20/02/23	Unit 1 Radioactivity Unit 2 Waves	Unit 1 Intro to radioactivity Unit 2 Waves (chapter 12)	Unit 1 State how big the nucleus is. Describe how the nucleus was discovered. Explain why it was not discovered earlier Define α, β, and γ radiation. Explain why it is dangerous. Describe the properties ofα, β, and γ radiation. Unit 2 State the general condition for the formation of a bright fringe. Describe Young's double slit experiment. Describe what factors could be (i)increased or(ii) decreased to increase the fringe spacing. Identify coherent sources. Explain why slits, rather than two separate light sources, are used in Young's double slit experiment. Describe the roles of diffraction and interference when producing Young's fringes Explain why diffraction of light is important in the design of optical instruments. Compare the single slit diffraction pattern with the pattern of Young's fringes. Describe the effect of the single slit pattern on the brightness of Young's fringes

	27/02/23	Unit 1 Radioactivity Unit 2 Waves	Unit 1 Alpha, beta and gamma Unit 2 Waves (chapter 12)	Unit 1 Describe what happens to the nucleus in a radioactive change. Describe how the intensity of γ radiation changes as it spreads out. Explain how to represent the change in a nucleus when it emits α, β, or γ radiation. Explain why ionising radiation is harmful. State the factors that determine whetherα, β, or γ are the most dangerous. Discuss how exposure to ionising radiation can be reduced. State what is meant by a decay curve. Define the half-life of a radioactive isotope. Discuss whether anything affects radioactive decay. Unit 2 Explain whya diffractiongrating diffractsmonochromatic light in certain directions only. If a coarser grating is used, explain the effect on the number of diffracted beams produced and on the spread of each diffracted beam. Determine the grating spacing for any given grating, if it is not known. Explain what we mean by rays. State Snell's law. Comment on whether refraction is different for a light ray travelling from a transparent substance into air.
	06/03/23	Unit 1 Radioactivity Unit 2 Waves	Unit 1 Alpha, beta and gamma Unit 2 Waves (chapter 12)	Unit 1 Describe how to do radioactive dating. Define radioactive tracers. Describe industrial uses of radioactivity Discuss what you can tell about radioactive isotopes from their neutron-to-proton ratio. Explain why naturally occurring isotopes don't emit β+ radiation. Describe what happens to an unstable nucleus Unit 2 Explainwhat happens to the speed of light waves when they enter amaterial such as water. Relate refractive index to the speed of light waves. Explain why a glass prism splits white light into the colours of a spectrum State the conditions for total internal reflection. Relate the critical angle to refractive index. Explain why diamonds sparkle.
	13/03/23	Unit 1 Radioactivity Unit 2 Waves	Unit 1 Radioactivity retrieval practice Unit 2 Waves (chapter 12) retrieval practice	Unit 1 Describe how to do radioactive dating. Define radioactive tracers. Describe industrial uses of radioactivity Discuss what you can tell about radioactive isotopes from their neutron-to-proton ratio. Explain why naturally occurring isotopes don't emit β+ radiation. Describe what happens to an unstable nucleus Unit 2 Explainwhat happens to the speed of light waves when they enter amaterial such as water. Relate refractive index to the speed of light waves. Explain why a glass prism splits white light into the colours of a spectrum State the conditions for total internal reflection. Relate the critical angle to refractive index. Explain why diamonds sparkle.
	20/03/23	Unit 1 Quantum Phenomena	Unit 1 Quantum mechanics and nuclear energy levels	Unit 1 Explain the photoelectric effect. Define a photon. Discuss how the photon model was established. Explain why Einstein's photon model was revolutionary. Define a quantum. Explain why an electron can't absorb several photons to escape from a metal Explain what is meant by ionisation of an atom. Explain what is meant by excitation of an atom. Explain what happens inside an atom when it becomes excited.