

Curriculum Map Year 12 - Physics

Topic Name	Term	Content / skills developed with link to NC / exam board subject content (if applicable)	Reflection on previous learning	Progress to future learning	Global Citizenship links	Qatar National Identity links
UNIT-1 MECHANICS AND MATERIALS (Unit 3 practical work embedded)	1	<ul style="list-style-type: none"> To be able to use the equations for motion: SUVAT. Draw and interpret motion graphs. Understand scalar and vectors. Resolve vector into two components at right angles. Make use of the independence of vertical and horizontal motion of a projectile moving freely Draw and interpret free-body force diagrams. Use and understand newtons laws. Understand that momentum is defined as $p=mv$ Know the principle of conservation of principle of linear momentum. Be able to use the equation for work, kinetic energy, and gravitational potential energy. Use equations relating to power and efficiency. 	Year 11- Forces and Motion	<ul style="list-style-type: none"> Rearrange the formula, convert unit, and carry out calculation. Construct graph for different situation. Study the motion of a bouncing ball. Study the equilibrium of three vertical forces using two pulley wheels. 	<p>PRIDE – Independence</p> <p>Prepare for challenge.</p> <p>Developing skills for the future</p>	<p>Sustainability: self-esteem and participation</p> <p>Sustainability: responsibility and creativity</p>
UNIT-1 MATERIALS (Unit 3 practical work embedded)	1	<p>Materials</p> <ul style="list-style-type: none"> Use Hookes law equations. Understand the relationships stress and strain and Young’s modulus. 	Year 11-Hooke’s Law Year 11-Solids liquids and gas	<ul style="list-style-type: none"> Motion on a linear air track to demonstrate Newton’s First law. 	PRIDE - Perseverance	Sustainability: self-esteem and participation

		<ul style="list-style-type: none"> • Draw and interpret force-extension and force compression graphs. • Understand the terms limit of proportionality, elastic limit, yield point, elastic and plastic deformation. • Draw and interpret tensile/compressive stress-strain graphs and understand the term breaking stress. • Calculate the elastic strain energy in a deformed material and from the area under the force-extension graph. • Relationship of upthrust = weight of fluid displaced • Able to use the equation for viscous drag. • Understand the equation applies to small spherical objects with laminar flow. • Force-extension and force-compression graphs. • $\Delta E_{el} = \frac{1}{2} F \Delta x$ • Idea of limit of proportionality, elastic limit, yield point, elastic deformation, and plastic deformation (including relation to graphs) • Tensile/compressive stress-strain graphs and understanding the term breaking stress. 		<ul style="list-style-type: none"> • 2 students on roller skates to demonstrate Newton's third law. • Study the transfer of GPE to KE for a trolley rolling down a ramp. • Analyse examples where the direction of the force is different to the direction of motion. • Use a falling-ball method to determine the viscosity of a liquid • Study the Young modulus of a material. 	<p>Prepare for challenge.</p> <p>Developing skills for the future</p>	<p>Sustainability: responsibility and creativity</p>
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<p>UNIT2- Waves (Unit 3 practical work embedded)</p>	<p>2</p>	<ul style="list-style-type: none"> • Understand the terms amplitude, frequency, period, speed, and wavelength. • Use the wave speed equation. • Describe transverse waves. • Draw and interpret graphs representing transverse and longitudinal including standing waves Know and understand what is meant by wave front, coherence, path difference, superposition, interference, and phase. • Use the relationship between phase and path difference. • Know what is meant by a standing wave and understand how this wave is formed, identifying nodes and antinodes. • Be able to use the equation for speed of a transverse wave on a string. • Understand plane polarisation. • Diffraction and Huygens construction • Use equation for diffraction grating. • Use the equation for intensity of radiation $I=P/A$ • Know and understand that at the interface between medium 1 and 2 • Calculate critical angle. • Predict whether total internal reflection will occur. 	<p>Grade 11-Waves</p>	<ul style="list-style-type: none"> • Study the speed of sound in air using a 2-beam oscilloscope, signal generator, speaker, and microphone. • Analyse interference of sound waves with loudspeakers and signal generator. Ripple tank demonstration. • Study standing waves on strings. • Analyse the effects of length, tension, and mass per unit length on the frequency of a vibrating string or wire. • Ripple tank to study refraction of wavefronts. • Ray tracing through a glass block. 	<p>PRIDE - Responsibility</p> <p>Prepare for challenge.</p> <p>Developing skills for the future</p>	<p>Sustainability: self-esteem and participation</p> <p>Sustainability: responsibility and creativity</p>
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UNIT-2 ELECTRICITY (Unit 3 practical work embedded)	2	<ul style="list-style-type: none"> • Understand what electric current is and use the equation $I=Q/T$ • Understand the equation $V=W/Q$ • Understand the resistance is defined by $R=V/I$ and that Ohms law is a special case when I proportional to V • Derive equations for combining resistance. • Use equations for power in an electric circuit. • Sketch and interpret IV graphs for components. • Use the equation for resistivity. • use equation for $I=nqvA$ • understand how the potential along a uniform current carrying wire varies with distance. • principles of a potential divider and analyse. • know definition of emf and terminal pd 	Grade 11-Electricity	<ul style="list-style-type: none"> • Study the variation of resistance of thermistor with change of temperature and LDR with change of light level. • Measure the electrical resistivity of a material. • Determine the e.m.f. and internal resistance of an electrical cell. 	PRIDE - Dedication Prepare for challenge. Developing skills for the future	Sustainability: self-esteem and participation Sustainability: responsibility and creativity

		<ul style="list-style-type: none"> understand how changes in temperature may be modelled in terms of lattice vibrations and conduction electrons 				
UNIT-2 NATURE OF LIGHT (Unit 3 practical work embedded)	2	<ul style="list-style-type: none"> Use $E=hf$ Understand photoelectrons. Understand the terms threshold frequency and work function and use the equation. Understand how the photoelectric effect provides evidence for the particle nature of EM radiation. Understand atomic line spectra in terms of transitions between discrete energy levels and how to calculate the frequency. 	Grade 11-Waves	Study the concept of quantum mechanics. Dual nature of light Electron Microscope	PRIDE Engagement Prepare for challenge. Developing skills for the future	Sustainability: self-esteem and participation Sustainability: responsibility and creativity