



Title	Competency	Learning Objectives
	Waves	Periodic Motion Stroboscopy Phase and Anti-Phase Vibration Characteristics of Reflected Waves Laws of Reflection
	Superposition of Waves	Interference of Fringes Beats Stationary Waves Melde's Experiment Applications
	Emission and Propagation of Sound	Identify the wave nature of sound Functioning of a loudspeaker The characteristics of a sound wave Recognize that the speed of propagation of sound depends on the properties of the medium
	Reception of Sound	The functioning of a microphone The functioning of the human ear Identify the range of audio frequencies
	Sound Energy	Energy carried by sound The loudness of sound at a given point and the corresponding sound level Thresholds of hearing and pain Doppler Effect
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	Musical Sounds	Distinguish between a pure sound and a complex sound

		A complex sound is the sum of many pure sounds The physiological qualities of sound
	Motion of a Particle in a Plane	Derivatives Frame of Reference Origin of Time Describe a Motion Velocity and Acceleration Vectors Tangential and Normal Components of the Acceleration Vector Linear and Angular Velocities Uniform Circular Motion.
	Newton's Second Law of Motion and Applications	Two Dimensional Motion Projectile Motion Period and Speed of Satellite Motion Kepler's Laws of Motion of Planets
	Systems of Particles	Internal and External Forces Center Of Mass of a System of Particles Motion of the Center of Mass of a System of Particle
	Rotational Dynamics	Translational and Rotational Motion of Rigid Bodies Moment of Inertia About an axis of Rotation Moment of a Couple Conditions of Equilibrium of a Solid Newton's Second Law to a Solid in Rotation.
	Work and Energy	Work of a Force Work done by a Couple of Constant Moment Power of a Force Kinetic, Potential, and Mechanical Energies Work – Energy Theorem Principle of Conservation of Mechanical Energy
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	Ideal Gases	Laws of Ideal Gases The ideal gas equation

		<p>The kinetic theory of gases</p> <p>Relation between the average kinetic energy of a molecule of monoatomic gas and its absolute temperature</p>
	Transfer of Heat Energy	<p>The zeroth law of thermodynamics</p> <p>A change of phase is related to a variation of the microscopic potential energy and that a change of temperature is related to a variation of the microscopic kinetic energy</p> <p>The latent heat of change of phase</p> <p>Distinguish between heat capacity and specific heat and specific heat capacity</p> <p>The principle of heat exchange</p>
	Laws of Thermodynamics	<p>The first law of thermodynamics</p> <p>Carnot's principle: the second law of thermodynamics</p> <p>The different efficiencies of a heat engine</p>
	Electric Field	<p>Electric Field Created by a Point Charge, by Two Point Charges</p> <p>Lines and Spectrum of an Electric Field</p> <p>Uniform Electric Field</p> <p>Electric Potential Energy</p>
	Capacitors	<p>Charging and Discharging of Capacitor</p> <p>Capacitance</p> <p>Capacitance of a Parallel Plate Capacitor</p> <p>Stored Energy</p> <p>Breakdown Potential.</p>
Title	Competency	Learning Objectives
	Magnetic Field	<p>Magnetic Spectrum of Bar Magnet</p> <p>U-shape Magnet</p> <p>Uniform Magnetic Field</p> <p>Terrestrial Magnetic Field.</p>

	Magnetic Field Created by an Electric Current	Fields Created by Current Carrying Wires of Particular Forms Analogy between Magnets and Coils.
	The Electromagnetic Force	Know the nature of the electromagnetic force Characteristics of the electromagnetic force Role of the electromagnetic force in the functioning of loudspeakers and electric motors
	The Motion of a Charged Particle in Electric and Magnetic Fields	Apply Newton's second law for a charged particle moving in a uniform electric field The principle of functioning of an oscilloscope Apply Newton's second law for a charged particle moving in a uniform magnetic field perpendicular to its initial velocity The functioning of the cyclotron
	Semi-conductors	Define the valency band and the conduction band Distinguish between the intrinsic and extrinsic semiconductors Describe the n-type and p-type of doping Define a junction diode and plot its V-I characteristics Explain the rectification of a current Distinguish between a junction diode and a Zener diode Know the roles played by a photodiode and of an LED
	Transistors	Describe a junction resistor Analyse the double role of a transistor Distinguish between the linear behavior and the saturation behavior Practical applications of a transistor
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	Operational Amplifiers	Describe an operational amplifier and identify its terminals Express the output potential difference as a

		<p>function of the input voltage in some electric circuits</p> <p>The voltage amplification is limited to the saturation potential difference</p> <p>Conditions of functioning of an ideal operational amplifier in a linear region</p>
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