

Competency Statements Standard XI

Area/ Unit/ Lesson	Competency Statements After studying the content in Textbook student ...
Units and Mathematical Tools	<ul style="list-style-type: none"> • Distinguish between fundamental and derived quantities. • Distinguish between different system of units and their use. • Identify methods to be used for measuring lengths and distances of varying magnitudes. • Check correctness of physical equations using dimensional analysis. • Establish the relation between related physical quantities using dimensional analysis. • Find conversion factors between the units of the same physical quantity in two different sets of units. • Identify different types of errors in measurement of physical quantities and estimate them. • Identify the order of magnitude of a given quantity and the significant figures in them. • Distinguish between scalar and vector quantities. • Perform addition, subtraction and multiplication (scalar and vector product) of vectors. • Determine the relative velocity between two objects. • Obtain derivatives and integrals of simple functions. • Obtain components of vectors. • Apply mathematical tools to analyze physics problems.
Motion and Gravitation	<ul style="list-style-type: none"> • Visualize motions in daily life in one, two and three dimensions. • Explain the necessity of Newton's first law of motion. • Categorize various forces of nature into four fundamental forces. • State various conservation principles and use these in daily life situations. • Derive expressions and evaluate work done by a constant force and variable force. • Organize/categorize the common principles between collisions and explosions. • Explain the necessity of defining impulse and apply it to collisions, etc. • Elaborate the limitations of Newton's laws of motion. • Elaborate different types of mechanical equilibria with suitable examples. • Apply the Kepler's laws of planetary motion to solar system. • Elaborate Newton's law of gravitation. • Calculate the values of acceleration due to gravity at any height above and depth below the earth's surface. • Distinguish between different orbits of earth's satellite. • Explain how escape velocity varies from planet. • Explain weightlessness in a satellite.
Properties of Matter	<ul style="list-style-type: none"> • Explain the difference between elasticity and plasticity • Identify elastic limit for a given material. • Differentiate between different types of elasticity modules. • Judge the suitability of materials for specific applications in daily life appliances. • Identify the role of force of friction in daily life. • Differentiate between good and bad conductors of heat. • Relate underlying physics for use of specific materials for use in thermometers for specific applications.
Sound and Optics	<ul style="list-style-type: none"> • Apply and relate various parameters related to wave motion. • Compare various types of waves with common features and distinguishing features. • Analytically relate the factors on which the speed of sound and speed of light depends. • Explain the essential factor to describe wave propagation and relate it with phase angle. • Apply the laws of reflection to light. • Mathematically describe the Doppler effect for sound waves. • Apply the laws of refraction to common phenomena in daily life like, a mirage or a rainbow. • Identify the defects in images obtained by mirrors and lenses, with their cause and ways of reducing or eliminating them. • Explain the construction and use of various optical instruments such as a microscope, a telescope, etc. • Relate dispersion of light with colour and apply it analytically with the help of prisms.

	<ul style="list-style-type: none"> • Describe dispersive power as a basic property of transparent materials and relate it with their refractive indices. • Analyze the time taken to receive an echo and calculate distance to the reflecting object. • Explain reverberation and acoustics.
Electricity and Magnetism	<ul style="list-style-type: none"> • Distinguish between conductors and insulators. • Apply coulomb's law and obtain the electric field due to a certain distribution of charges. • Define dipole, obtain the dipolar field. • Relate the drift of electrons in a conductor to resistivity • Calculate resistivity at various temperature. • Connect resistors in series and parallel combination. • Compare electric and magnetic fields. • Draw electric and magnetic lines of force. • Obtain magnetic parameters of the Earth. • Solve numerical and analytical problems.
Communication and Semiconductors	<ul style="list-style-type: none"> • Explain the properties of an electromagnetic wave. • Distinguish between mechanical waves and electromagnetic waves. • Identify different types of electromagnetic radiations from γ- rays to radio waves. • Distinguish between different modes of propagation of EM waves through earth's atmosphere. • Identify different elements of a communication system. • Explain different types of modulation and identify the types of modulation needed in given situation. • Distinguish between conductors, insulators and semiconductors based on band structure. • Differentiate between p type and n type semiconductors and their uses. • Explain working of forward and reverse biased junction. • Explain the working of semiconductor diode.