**BUDHA DAL PUBLIC SCHOOL PATIALA ANNUAL PEDAGOGY SESSION 2023 – 2024.**

**CLASS: XI SUBJECT: PHYSICS**

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| **TOPIC** | **INNOVATIVE/ART INTEGRATION/EXPERENTIAL LEARNING/INTER-DISCIPLINARY** | **Expected Learning Outcomes** |
| **Kinematics.**  Frame of reference, Motion in a straight line: Position-time graph, speed and velocity. Elementary concepts of differentiation and integration for describing motion. Uniform and non- uniform motion, average speed and instantaneous velocity. Uniformly accelerated motion, velocity- time and position- time graphs. Relations for uniformly accelerated motion (graphical treatment) | **EXPERENTIAL LEARNING**  Examples from daily life will be given to explain rest and motion and various type of motion like 1D, 2D and 3D.  ART INTEGRATION  drawing of diagrams and graphs.  INTERDISCIPLINARY Integrated with English and mathematics. | Students will learn  ● to differentiate  between one  dimension, two  dimension and three  dimensional motion.  ● the concept of  uniform, non-uniform  and accelerated  motion.  ● the concept of  average speed,  instantaneous speed.  ● the difference  between speed and  velocity.  ● the projectile motion  , maximum  Range, height and time  of flight.  ● the uniform and nonuniform circular motion. |
| **Vectors/**  **Basic**  mathematical  concepts  Scalar and vector  quantities;  Position and  displacement  vectors, general  vectors and their  notations; equality  of vectors,  multiplication of  vectors by a real  number; addition  and subtraction of  vectors. Unit  vector; Resolution  of a vector in a  plane - rectangular  components.  Scalar and Vector  product of vectors. | **EXPERENTIAL LEARNING**  Activity based on parallelogram law of vectors will be demonstrated to find unknown weight.  ART INTEGRATION  drawing of diagrams and graphs.  INTERDISCIPLINARY Integrated with English and mathematics. | Students will learn the concept of scalar and vector quantities ● the concept of dot and cross product of two vectors. ● the triangle, polygon and parallelogram laws of vectors |
| **Physical world and measurement**  Types of physical quantities, fundamental and derived units, dimensional analysis,error analysis. | **EXPERENTIAL LEARNING**  Giving examples of fundamental quantities from daily life like mass, length , time and temperature.  **ART INTEGRATION**  Drawing of diagrams in parallax method.  **INTERDISCIPLINARY** Integrated with English and mathematics | Students will learn about the difference between fundamental and derived quantities and also between accuracy and precision. |
| **Laws of Motion** - force (balanced and unbalanced force) and motion, Newton’s laws and its applications, inertia, momentum, Impulse, law of conservation of linear momentum. Connected pullies and elevator problems, | **EXPERENTIAL LEARNING**  Activity based on finding coefficient of friction will be demonstrated to find unknown µ using inclined plane and horizontal plane apparatus.  ART INTEGRATION  drawing of diagrams and graphs.  INTERDISCIPLINARY Integrated with English and mathematics. | Student will learn concept of force and difference between balanced and unbalanced forces. ● They have learned the concept of inertia and its type. ● They have learned the keys of Newton’s laws. ● They have learned the to formulate the Newton’s second law of motion. ● They have learned the concept of momentum and impulse. ● They have learned the concept and types of collision. ● and Momentum of body. They have learned the application of inertia of rest and motion in day to day life ● They have learned the application and concept of Newton’s laws in daily actions |
| **Work power and Energy.** Work done by a constant force and variable force, kinetic energy ,work energy theorem, power. Notion of potential energy, potential energy of a spring, conservative forces, conservation of mechanical energy, non conservative forces, elastic and inelastic collisions in one and two dimensions. | **EXPERENTIAL LEARNING**  By demonstrating the activity using spring balance and bob the potential energy stored in an object will be explained. And by law of conservation of energy the speed of an object when falling from a certain height will be calculated and using the value of speed kinetic energy will be calculated.  ART INTEGRATION  drawing of diagrams and graphs.  INTERDISCIPLINARY Integrated with English and mathematics | **Students** will learn ● The concept Work done by a constant force and variable force ● The application of law of conservation of energy. ● To differentiate between elastic and inelastic collision. ● Different types of work done |
| **Centre of mass and Rotational Motion** and centre of mass of two-particle system, momentum conservation and centre of mass motion, centre of mass of rigid body, centre of mass of uniform rod. Vector product of vectors, moment of force, torque, angular momentum, conservation of angular momentum with some examples. Equilibrium of rigid bodies, comparison of linear and rotational motion, moment of inertia and radius of gyration. Values of moments of inertia for simple geometrical object, statement of parallel and perpendicular axes theorem and their applications | **EXPERENTIAL LEARNING**  Using C.D. and ring moment of inertia and centre of mass will be demonstrated.  ART INTEGRATION  drawing of diagrams and graphs.  INTERDISCIPLINARY Integrated with English and mathematics. | Students will be able to learn • The concept centre of mass motion, centre of mass of rigid body • The comparison of linear and rotational motion • The concept of • moment of inertia • the concept of moment of inertia. • The concept of torque and applications of torque-- |
| **Gravitation** Kepler’s laws of planetary motion. The universal law of gravitation, Acceleration due to gravity and its variation with altitude and depth, gravitational potential energy, gravitational potential, Escape velocity, critical velocity, orbital velocity of a satellite. Geostationary satellite | **EXPERENTIAL LEARNING**  Determination of acceleration due to gravity by simple pendulum • Using pendulum of different masses ,verification of laws of time period -  ART INTEGRATION  drawing of diagrams and graphs.  INTERDISCIPLINARY Integrated with English and mathematics. | Students will learn • How the launching of satellite is done • Variation in acceleration due o gravity with height and depth. • Potential and gravitational potential energy. • How the energy of satellite is calculated |
| **Properties of**  **Matter:** 1. Solids-  Elastic behavior of  solids, stress,  strain, elastic limit,  Hook’s law,  Modulus of  elasticity, potential  energy in a  starched  wire,poisson;s  ratio, thermal  stress  2.  Hydrostatics (fluids  at rest); Pressure  of liquid,  applications of  concept of  pressure, density,  hydrostatic  paradox, Pascal’s  law, Atmospheric  pressure,  Buoyancy  intermolecular  forces, important  terms related to  surface tension,  surface energy,  excess pressure,  angle of contact,  capillarity, ascent  formula.  3.Hydrodynamics;  viscosity,  Poiseuille’s  formula, Stoke’s  law, terminal  velocity,  streamline  turbulent and  Laminar flow,  critical velocity,  Reynold’s number,  equation of  continuity,  Bernoulli’s  theorem, Blood  pressure. | **EXPERENTIAL LEARNING**  Activities • Determination of coefficient of viscosity of glycerin by estimating terminal velocity • Determination of Young’s modulus of elasticity by Sear’ls apparatus  ART INTEGRATION  drawing of diagrams and graphs.  INTERDISCIPLINARY Integrated with English and mathematics | Students will learn the concept Elasticity The application of Pascal’s law. • The concept of surface tension of liquid, surface energy • The applications Bernoulli’s theorem • |
| **Thermodynamics and KTG** Thermal properties of matter; Heat, Temperature, thermal expansion, types of thermal expansion, Anomalous expansion of water, expansion of gases, Specific heat capacity, water equivalent, change of state, latent Thermal equilibrium, Zeroth law of thermodynamics, thermodynamic state variables and equation of state, indicator diagram or p-v diagram, isothermal change, Adiabatic change, slopes and work done of isothermal and adiabatic changes, isobaric and isochoric changes, first law of thermodynamics, Applications of the first law ,cuclic and non-cyclic process second law of thermodynamics. gases - assumptions, concept of pressure. Kinetic interpretation of temperature; rms speed of gas molecules; degrees of freedom, law of equipartition of energy (statement only) and application to specific heat capacities of gases; concept of mean free path, | **EXPERENTIAL LEARNING**  Verification of Newton’s law of cooling can be demonstrated.  ART INTEGRATION  drawing of diagrams and graphs.  INTERDISCIPLINARY Integrated with English and mathematics | Students have learnt the meaning of thermodynamics The concept of isothemal process and adiabatic process. • The principleThermal properties of matter, Heat, Temperature, • Anomalous expansion of water, expansion of gases, • Specific heat capacity, water equivalent, • change of state, latent heat, calorimetric, two principal specific heats of gas |
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| **Oscillations and Waves** Periodic motion - time period, frequency, displacement as a function of time. Periodic functions. Simple harmonic motion (S.H.M) and its equation; phase; oscillations of a spring– restoring force and force constant; energy in S.H.M. Kinetic and potential energies; simple pendulum– derivation of expression for its time period. Free, forced and damped oscillations (qualitative ideas only), resonance. Wave motion. Transverse and longitudinal waves, speed of wave motion. Displacement relation for a progressive wave. Principle of superposition of waves, reflection of waves, standing waves in strings and organ pipes, fundamental mode and harmonics, Beats, | **EXPERENTIAL LEARNING**  • Concept of periodic motion and oscillations with the help of simple pendulum. • Formation of stationary waves by sonometer • Formation of stationary waves by resonance column.  ART INTEGRATION  drawing of diagrams and graphs.  INTERDISCIPLINARY Integrated with English and mathematics. | Students will have learnt - • the concept of Periodic motion • time period, frequency, • Free, forced and damped oscillations • Wave motion. Transverse and longitudinal waves, speed of wave motion. Displacement relation • Principle of superposition of waves. reflection of waves, standing • Understand Principle of superposition of waves, reflection of waves, standing waves in strings and organ pipes, fundamental mode and harmonics, Beats, Doppler effec |