Year at a Glance Physics APA 2020-2021
Readiness, Supporting TEKS

C&I approved

1ˢᵗ Grading Period	2ⁿᵈ Grading Period

Introductions, Get to know you activities, safety protocols, start of school procedures, Capturing Kids Hearts, math review, accuracy and precision **(P.1A, 2G, 2J)**
 	
 Motion
 • Graphing motion **(P.4A)**
  • Organization and evaluation of data
 • Distance and displacement **(P.4A & B)**
  • Scalar/Vectors (simple)
  • Speed and velocity
  • Average/Instantaneous velocity
  • Relative motion
 • Frame of reference
 • Rocketry Lessons
  • Rocket Propulsion Activity
  • Balloon lab with fins (may take several days to design, test, and re-design)
 	
 Uniform Acceleration
 • Acceleration **(P.4 A - B)**
 • Big 4 **(P.4B)**
  • Algebra review
 • Free fall **(P.4 A - B)**
  • ADI Introduction lab on Free Fall
 • Vector components (vocab and conceptual) **(P.3E)**
 • Projectiles **(P.4C)**
	Uniform Acceleration continued
	 • Possible Project: Students build and launch a catapult/trebuchet **(P.4 A – B, P.4C)**
	 • Rocketry Lessons
	  • Foam Rockets
	
	 Forces
	 • Newton's Laws **(P.4D)**
	 • Free Body Diagrams **(P.4E)**
	 • Vector addition and components (conceptual; math uses Pythagorean Theorems) **(P.3E)**
	 • Force of gravity **(P.5A)**
	 • Rocketry Activities
	  • Build Rocket
	  • Determine weight and area of rocket
	
	 Other Forces
	 • Circular motion and its calculations **(P.4C), (P.5B)**
	  • Circular acceleration
	  • Circular velocity
	  • Centrifugal force
	  • Torque & formula
	 • Newton's Law of Universal Gravitation **(P.5A), (P.5B)**
	 • Possible Project: Students build a bridge that support a given amount of weight **(P.4C , P.4D, P.5A, P.5B)**
	 • Rocketry Activities
	  • Determine center of gravity and pressure
	  • Determine weight and area of rocket
	 District Semester Exam

3rd Grading Period	4th Grading Period

Momentum
 • Conservation of momentum **(P.6D)**
 • Calculating momentum **(P.6C)**
 	
 Energy & Thermodynamics
 • Work-energy Theorem W=Fd **(P.6A)**
 • KE/PE **(P.6B)**
 • Calculate mechanical energy **(P.6C)**
 • Power **(P.6C)**
 • Conservation of energy **(P.6D)**
 • Use conservation of energy and conservation of momentum to identify types of collision systems **(P.6C, P.6D)**
 • Investigations with Pendulums and Springs to show KE and PE **(P.6B)**
 • Four Laws of Thermodynamics **(P.6E)**
 • Examples representing 4 laws of thermodynamics **(P.6E)**
 • Conduction/Convection/Radiation **(P.6E)**
 • Possible Project: Egg Drop- Students build a device to protect an egg from a fall or 3D Cardstock roller coaster for a marble **(P.6B, P.6C)**
 • Rocketry Activities
    • Launch rocket
    • Determine rocket's altitude
    • Determine rocket's terminal velocity
 	
 Waves: Sound & Optics
 • Waves through different types of medium **(P.7A)**
 • Wave characteristics **(P.7B)**
 • Calculations: frequency, wave speed, wavelength **(P.7B)**
 • Transverse vs Longitudinal **(P.7C)**
 • Wave behaviors **(P.7D)**
    • Resonance
    • Doppler Effect
    • Interference
    • Reflection- mirrors **(P.7E)**
    • Refraction –convex lenses **(P.7E)**
    • Diffraction
 • Scientist: Snellius – Snell's law **(P.3C)**
 • Possible Project: Students build a musical instrument, get in a group, create and play a song **(P.7B, P.7D)**
	Waves: Sound & Optics (continued)
	
	 Electricity & Magnetism
	 • What is electromagnetic force **(P.5A)**
	 • Electric/magnetic fields in devices **(P.5A)**
	 • Examples of electric/magnetic fields and forces in real life **(P.5D)**
	 • Conductors/Insulators **(P.5E)**
	 • Calculate electric force between objects based upon charges and distances between centers **(P.5C)**
	 • V=IR **(P.5F)**
	 • Possible Project: Students will build a 3-D model containing parallel and series circuits **(P.5F)**
	 • Calculations **(P.5F)**
	
	 Atomic & Nuclear
	 • Photoelectric **(P.8A)**
	 • Dual nature **(P.8A)**
	 • Double Slit Experiment **(P.8A)**
	 • Compare emission spectra **(P.8B)**
	 • Effects of strong/weak forces **(P.5A)**
	 • Calculate and apply Mass-Energy Equivalence **(P.8C)**
	 • Research examples of nuclear disasters to explain causality of the nuclear phenomena in play **(P.8D)**
	 • Examples of applications of atomic, nuclear and quantum phenomena: nuclear stability, fission, fusion, radiation therapy, diagnostic imaging, semiconductors, superconductors, solar cells, nuclear power **(P.8D)**
	
	 Review/Semester Exam/Final Project

Process standards are taught throughout the entire year.