

**Department:** Science

**Course Name:** Physics

**Course Description:**

An introductory course exploring the relationships between matter, energy, and forces in nature with applications in daily life. The emphasis is on conceptual physics with mathematics used as a tool for problem solving and a guide to consistent and correct thinking. Pre-requisite: Algebra II or higher. Topics include mechanics, gravitation, light, sound, fluids, thermodynamics, oscillations, waves, optics, electricity, and magnetism. Students will perform experiments and submit lab report evaluation forms for assessing their comprehension of theory, procedure, numerical results, and experimental uncertainties

**Content:**

Kinematics (including vectors, coordinate systems, displacement, velocity, acceleration)

Motion in 1-Dimension (graphical representations; slope/area connections)

Motion in 2-Dimensions (projectile motion, uniform circular motion)

Newton's Laws of Motion

Static Equilibrium

One Body Systems

Two Body Systems

Work, Energy, Power

Work-Energy Theorem

Conservative Forces

Conservation of Energy

Systems of Particles/Linear Momentum

Impulse and Momentum

Conservation of Linear Momentum (Collisions)

Rotation/Angular Momentum

Torque

Moment of Inertia

Angular Momentum (Conservation of Angular Momentum)

Oscillations (Periodic Systems)

Simple Harmonic Motion

Mass on a Spring

Pendulums

Universal Law of Gravitation (Orbits, Kepler's Laws)

Kinetic Theory, and Thermodynamics

Temperature and Heat

Specific and Latent Heat (Calorimetry)

Heat Transfer

Thermal Expansion

Ideal gases

Laws of Thermodynamics

Waves and Physical Optics

Wave Motion

Traveling and Standing Waves

Doppler Effect

Superposition Principle

Resonance

Snell's Law  
Total Internal Reflection  
Interference and Diffraction  
Dispersion of Light  
Electromagnetic Spectrum

**Skills:**

Collaborate to gather data  
Generate and interpret data in tabular and graphical form  
Construct laboratory reports  
Analyze data  
Represent data graphically using spreadsheets  
Utilize advanced features of a scientific graphing calculator  
Apply math and logical reasoning to problem solving

**Text and Materials:**

Serway and Faughn. Physics (Holt, Rinehart, and Winston, 2006)  
Online education resources

**Methods of Instruction:**

Utilize a Learning management system for accessing content, assignments, and assignment submission  
Lecture  
iPad notes, apps, and visualizations  
Real time (live) demonstrations  
Laboratory experiments  
Excel Data analysis tutorials  
“Quizizz” class game competitions  
Online videos, practice problems  
Online interactive virtual labs  
Quiz and Test review  
Online assessments

**Methods of Evaluation:**

Quizzes  
Tests  
Lab reports  
Activity worksheets  
Homework  
Class productivity  
Class participation  
Lab participation