Advanced Placement®** Physics B

COURSE DESCRIPTION:

AP Physics is a yearlong introduction to the algebra-based major areas of physics – mechanics, fluids, waves, optics, electricity, magnetism and modern physics (atomic and nuclear). Students learn to think like scientists: making predictions based on observations, writing hypothesis, designing and completing experiments, and reaching conclusions based on the analysis of data derived from these experiments. Students apply the concepts of physics to their everyday experiences and current events and issues in science and engineering. The course provides opportunities for guided inquiry and student-centered learning to foster critical thinking skills.

COURSE OBJECTIVES:

Upon completion of this course, the student will be able to:

- Read, understand, and interpret physical information
- Demonstrate proficiency in explaining and solving algebra-based problems in the major areas of physics
- Apply the concepts and procedures of scientific reasoning to understanding physics phenomenon
- Perform experiments, interpret the results of observations and communicate results

PREREQUISITES: Successful completion of Algebra II and Trigonometry with one year of Physics highly recommended

COURSE LENGTH: Two semesters

REQUIRED TEXT: *Physics: Principles with Applications*, 7/E (KCDL Package)
Giancoli | ©2009 | Pearson ISBN: 0-13-607302-6

E-Science/Aventa AP Physics Laboratory Kit

COURSE OUTLINE:

UNIT I: Introduction to Physics

- Mathematics and Science Review
- Data Collection and Analysis

UNIT II: Kinematics

- Motion in One Dimension
- Motion in Two Dimensions

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Advanced Placement®** Physics B (continued)

COURSE OUTLINE (continued):

UNIT III: Newton's Laws of Motion
- Static Equilibrium
- Dynamic Equilibrium
- Systems of Two or More Objects

UNIT IV: Work, Energy, Power and Momentum
- Forces, Work and Work-Energy Theorem
- Conservation of Energy
- Power
- Simple Harmonic Motion, Springs, and the Pendulum
- Gravity and Orbits
- Momentum & Impulse
- Circular Motion & Torque

UNIT V: Fluid Mechanics
- Density and Pressure
- Buoyancy
- Fluids in Motion

UNIT VI: Thermal Physics
- Temperature and Heat
- Ideal Gases
- Thermodynamics
- Semester Exam

UNIT VII: Electrostatics
- Charge and Coulomb's Law
- Electric Field and Electric Potential
- Electrostatics with Conductors
- Capacitors

UNIT VIII: Electric Circuits
- Currents, Resistance, & Power
- Direct Currents
- Capacitors in Circuits

UNIT XI: Magnetic Fields and Electromagnetism
- Magnetic Fields
- Electromagnetic Induction

UNIT X: Wave Motion, and Sound
- Traveling Waves
- Wave Propagation
- Standing Waves

UNIT XI: Optics
- Physical Optics
- Geometric Optics
- Mirrors
- Lenses

UNIT XII: Modern Physics
- Atomic Physics and Quantum Effects
- Atomic Energy Levels and Wave-Particle Duality
- Nuclear Physics

UNIT XIII: Preparing for the AP Physics Exam
- Preparing for the Exam
- The Final Exam
- Post Worldwar II Civil Rights Legislation

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