

Perry Local School Guaranteed and Viable Curriculum

HS AP Physics B

Power Objectives

Physical Sciences

SCAPPHB.3.1

Evaluate the historical development of astronomical science that led to the formulation of the law of universal gravitation.

SCAPPHB.3.1.a

Utilize Newton's Law of Universal Gravitation in order to calculate the force that one spherically symmetrical mass exerts on another.

SCAPPHB.3.1.b

Associate scientists with key contributions to the five areas of physics: mechanics, heat and kinetic theory, electricity and magnetism, waves and optics, and modern physics.

SCAPPHB.3.2

Apply principles of forces and motion to mathematically analyze, describe, and predict the net effects on objects and systems.

SCAPPHB.3.2.a

Apply kinematical equations of motion to solve advanced problems involving one-dimensional motion.

SCAPPHB.3.2.b

Analyze and solve problems involving two dimensional motion of projectiles in a uniform gravitational field by utilizing component vector resolution.

SCAPPHB.3.2.c

Analyze situations in which an object remains at rest or moves with constant velocity under the influence of several forces by utilizing Newton's three laws.

SCAPPHB.3.2.d

Calculate the total linear momentum and impulse of a defined system of bodies.

SCAPPHB.3.2.e

Solve circular motion and torque problems.

SCAPPHB.3.2.f

Analyze the simple harmonic motion and energy content of a swing and spring pendulum and to identify points in the motion where the velocity and/or acceleration is zero or achieves its maximum positive or negative value.

SCAPPHB.3.2.g

Utilize Newton's Law of Universal Gravitation in order to calculate the force that one spherically symmetrical mass exerts on another.

SCAPPHB.3.3

Characterize physical changes in terms of energy, work, and power.

SCAPPHB.3.3.a

Comprehend heat transfer and thermal expansion in order to calculate mechanical equivalent of heat problems.

SCAPPHB.3.3.b

Calculate the work done, power needed, change in kinetic energy and/or potential energy on a system by applying the "work-energy" theorem.

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SCAPPHB.3.3.c

Utilize first and second laws of thermodynamics in order to interpret P-V diagrams and to solve heat engine problems.

SCAPPHB.3.4

Apply wave phenomena to analyze mechanical and electromagnetic energy.

SCAPPHB.3.4.a

Evaluate the description of waves and solve problems relating to wavelength, frequency, velocity of a wave, and source/observer analysis.

SCAPPHB.3.4.b

State conditions necessary for and apply principles of interference, diffraction and dispersion of electromagnetic waves in order to solve related wave optics problems.

SCAPPHB.3.4.c

Utilize and apply the principles of reflection, refraction, and Snell's law in order to compute image formation data involving converging and diverging lenses and mirrors.

SCAPPHB.3.4.d

Apply knowledge of properties of photons and the photoelectric effect, atomic energy levels, wave-particle duality, nuclear reactions, and mass-energy equivalence in order to solve atomic and nuclear physics problem.

SCAPPHB.3.5

Utilize knowledge of electricity and magnetism to address electrostatics, potential difference, capacitance, induction of charge, and magnetism.

SCAPPHB.3.5.a

Apply Coulomb's law and characteristics of electric fields and forces in order to calculate the magnitude and direction of the force on a positive or negative charge placed in a specified field.

SCAPPHB.3.5.b

Recognize the behavior of series and parallel combinations of resistors and capacitors in order to apply Ohm's law, equivalent resistance equations, and the power equations to compute circuit measurements of current, change in voltage, resistance, and power dissipation for any resistor in such a network of resistors connected to a single battery.

SCAPPHB.3.5.c

Analyze the force experienced by a charged particle in a magnetic field in order to calculate the magnitude and direction of the force in terms of q , v , and B , and also to calculate the magnitude and direction of the force on a straight segment of current-carrying wire in a uniform magnetic field.

SCAPPHB.3.5.d

Use Faraday's law and Lenz's law in order to recognize situations in which changing flux through a loop will cause an induced emf or current in the loop and to make calculations of forces, emf, and power involved.

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Scientific Inquiry

SCAPPHB.5.1

Demonstrate the use of the scientific method and technology in conducting scientific exercises.

SCAPPHB.5.1.a

Formulate hypotheses to solve scientific problems.

SCAPPHB.5.1.b

Design experiments to test hypotheses.

SCAPPHB.5.1.c

Use basic laboratory skills to safely conduct experiments.

SCAPPHB.5.1.d

Gather and interpret qualitative and quantitative experimental data.

SCAPPHB.5.1.e

Utilize ethical practices in conducting laboratory experiments.

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Scientific Ways of Knowing

SCAPPHB.6.1

Appraise emerging scientific issues associated with the physical sciences.