

Curriculum – AP Physics

This year your child's curriculum will include the following:

Unit 1: Newtonian Mechanics

Curricular Materials Utilized: Unit developed by the College Board.

Unit Overview: This unit lasts the first 13 weeks of school. It begins by describing one dimensional and two dimensional motions and explaining all motion through Newton's Laws. Then, it progresses into the concepts of work, power, and conservation laws including energy and momentum. Finally, we analyze circular motion, rotation and oscillations.

Essential Questions:

- How can one describe motion?
- What causes motion?
- How are work and energy related?
- What does it mean to conserve?
- What is the cause repetitive motion?

Unit 2: Fluid Mechanics and Thermal Physics

Curricular Materials Utilized: Unit developed by the College Board.

Unit Overview: This unit lasts 5 weeks of school. It begins by describing and analyzing static fluids including pressure and buoyancy. Next, it studies fluids in motion and focuses on the equation of continuity and Bernoulli's equation. Finally, the unit examines temperature, heat and internal energy. Special emphasis is placed on graphing an ideal gas as it progresses through different thermodynamic processes.

Essential Questions:

- What factors affect pressure?
- Why do things float and sink?
- What is the difference between temperature, heat and internal energy?
- How are different thermodynamic processes represented on a graph?

Unit 3: Electricity and Magnetism

Curricular Materials Utilized: Unit developed by the College Board.

Unit Overview: This unit lasts 7 weeks of school. It begins by describing and analyzing static charge and their interactions including electric force, field, and potential. Next, it studies simple resistor or capacitor circuits (series, parallel, and combination). Then, the nature of magnetism and magnetic force are examined. Finally, the unit examines the electromagnetic induction.

Essential Questions:

- How do charges interact with each other?
- How do charges behave in electric fields?
- How can you determine the current, voltage, capacitance, charge or resistance of different components in a circuit?
- What is the magnetism and where does it arise?
- How are electrical currents produced?

Unit 4: Waves and Optics

Curricular Materials Utilized: Unit developed by the College Board.

Unit Overview: This unit lasts 4 weeks of school. It begins by describing and analyzing different types of wave motion including parts of the wave, wavelength, period, frequency, and wave speed. Next, it studies the particle nature of light through mirrors and lenses. Finally, the wave nature of light is examined through interference, diffraction, and dispersion.

Essential Questions:

- How can one describe wave motion?
- How can light sometimes behave like a particle and other times behave like a wave?

Unit 5: Nuclear and Atomic Physics

Curricular Materials Utilized: Unit developed by the College Board.

Unit Overview: This unit lasts 4 weeks of school. It begins by describing and analyzing the nucleus of the atom and different nuclear radiation that can occur. Next,

we study atomic structure, energy levels, and the interaction of light and particles including the photoelectric effect and Compton effect.

Essential Questions:

- How is mass equivalent to energy?
- What are the possible nuclear decays that an unstable nucleus can go through?
- How can the absorption or emission of light affect an electron's energy level?