Southmoreland School District
AP Physics 1 Curriculum Overview

AP Physics 1 Overview:

AP Physics 1 will start with introductory physics skills and will progress into the study of straight line motion, force, energy, rotational motion, momentum and electrostatics. AP Physics 1 is highly recommended for students planning to enter the life sciences, pre-medicine or engineering fields. Students may be eligible to receive college credit for physics, based on the rules of their selected college. It is recommended, but not required, that students take CP Physics prior to AP Physics 1.

Module Titles:

Module 1: Kinematics the study of motion.
Module 2: Dynamics - force and motion.
Module 3: Circular motion and gravitation.
Module 4: Energy.
Module 5: Momentum.
Module 6: Simple Harmonic Motion
Module 7: Torque and Rotational motion

Module Overviews:

Module 1: Kinematics the study of motion
Introduces students to the study of motion and serves as a foundation for all of AP Physics By studying kinematics, students will learn to represent motion—both uniform and accelerating—in narrative, graphical, and/or mathematical forms and from different frames of reference. Lastly, students will begin making predictions about motion and justifying claims with evidence by exploring the relationships between the physical quantities of acceleration, velocity, position, and time.

Module 2: Dynamics - force and motion
Students are introduced to the term force, Students must be able to portray the same object–force interactions through different graphs, diagrams, and mathematical relationships. Students will continue to make meaning from models and representations that will help them further analyze systems, the interactions between systems, and how these interactions result in change. Module 2 also encourages students to derive new expressions from fundamental principles to help them make predictions in unfamiliar, applied contexts.

Module 3: Circular motion and gravitation
Students will combine equations for uniform circular motion with gravitational equations to describe the circular path of a satellite circling a planet. Students will study mathematical and graphical representations to determine how doubling the distance of a satellite from a planet will change the period of orbit and then justify their answer with evidence and reasoning. Specific preconceptions will be addressed in this module, such as the idea of a centrifugal force. Students will also have opportunities to wrestle with the idea of field models.

Module 4: Energy
Students will be introduced to the idea of conservation of energy as a foundational model of physics, along with the concept of work as the agent of change for energy. As students' comprehension of energy (particularly kinetic, potential, and microscopic internal energy) evolves, they will begin to connect and relate knowledge across scales, concepts, and representations, as well as across disciplines.

Module 5: Momentum
Students study the relationship between force, time, and momentum via calculations, data analysis, designing experiments, and making predictions. Students will learn how to use new models and representations to illustrate the law of the conservation of momentum of objects and systems while simultaneously building on their knowledge of previously studied representations.

Module 6: Simple Harmonic Motion
Students will analyze a new type of motion: simple harmonic motion. Although simple harmonic motion is unique, students will learn that even in new situations, the fundamental laws of physics remain the same. Harmonic relationship between the amplitude and period of oscillation—will also be addressed to provide students with a more nuanced awareness of simple harmonic motion.

Module 7: Torque and Rotational motion
Students will study torque and rotational motion. These topics present more complex scenarios, the tools of analysis remain the same. During their study of torque and rotational motion, students will be confronted with different ways of thinking about and modeling forces. module 7 also focuses on the mathematical practice of estimating quantities that can describe natural phenomena. Throughout this module, students will have opportunities to compare and connect their understanding of linear and rotational

motion, dynamics, energy, and momentum to make meaning of these concepts as a whole, rather than as distinct and separate units.