

**Math and Science Academy**  
**Honors and Advance Placement Physics Course Description**  
**and**  
**Syllabus**

**Physics - 11<sup>th</sup> grade** (excerpt from the course catalog)

Physics is the fundamental science from which all other sciences are derived. This basic algebra-based physics course will cover all areas of mechanics including; motion, forces, work, power, energy, and conservation laws. It will also cover topics such as waves, sound, electricity and magnetism. Activities center around student developed laboratory experiments called "Models", for exploring each topic. High emphasis is placed on the ability to analyze observations, draw valid conclusions and solve problems. Prerequisite: "B" or higher in Pre-Calculus; two of the following: PSAT Composite of 70 or greater, B or greater final grade for Pre-physics, or instructor approval.

The student will:

- demonstrate an understanding of the nature of motion under inertial conditions and when accelerated
- demonstrate an understanding how graphs can be used to describe an objects motion
- demonstrate an understanding of the nature of forces
- demonstrate an understanding of Newton's Laws of Motion
- demonstrate an understanding of conservation of energy and momentum
- demonstrate an understanding of projectile motion
- demonstrate an understanding of the vector nature of certain physical quantities
- demonstrate an understanding of circular and rotational motion
- demonstrate an understanding of sound as wave phenomena
- demonstrate an understanding of static charges and electrical forces
- demonstrate an understanding of electrical current
- demonstrate an understanding of resistive, capacitive and inductive circuits and schematics

AP May term 2010 (last 18 school days of the year) for the 2009 – 2010 school year.

The student will:

- demonstrate and understanding of sound
- demonstrate an understanding of light and optics
- demonstrate an understanding of fluid dynamics
- demonstrate an understanding of atomic and nuclear physics

For the 2008 – 2009 school year only AP Physics students will cover the above as independent study meeting a minimum of once per week in place of study hall for labs and instruction.

MSA uses the **Modeling for Physics** method for curriculum delivery. Here is an explanation of the "Modeling Cycle".

## **Modeling Cycle**

Modeling Instruction attempts to enhance student achievement through a process called the Modeling Cycle, following Robert Karplus's fine example, the Learning Cycle.