

Physics is the most basic of sciences. It is the study of the physical world, the interrelationship between matter and energy. Topics included in the study of Physics include the theoretical and experimental study of motion and forces, friction and momentum, fluid dynamics, thermodynamics and heat, wave motion, sound, light and optics, electromagnetism and modern physics. An integral part of the course is extensive laboratory experiments with a variety of equipment, from simple to highly technological. Students are expected to mathematically analyze physical phenomena and apply the laws of physics.

Honors students are expected to complete extensive projects, be independently motivated, and have high-level math ability.

## II) Course Learning Goals:

### A) Skills embedded throughout the Physics course:

As a result of the Physics course, students will be able to:

- 1) Use knowledge of physics to make and support informed judgments about current issues and problems.
- 2) Identify and solve problems through scientific experimentation: formulate hypotheses, design experiments, use technology, analyze data, and make and communicate conclusions.
- 3) Apply the scientific process to critically evaluate data, its sources, and its validity in constructing theories and models.
- 4) Assess and apply knowledge of safe scientific procedures, both to the classroom and to everyday life.
- 5) Select and use appropriate laboratory equipment, technology, and units to measure physics properties.

## B) Content Goals of Physics:

-The student will be able to: apply the methods of observe, organize and conclude to ---interpret and communicate changes in matter and energy

-use measuring devices and senses to observe and record physical properties of matter

-employ mathematics and the metric system to manipulate and interpret data through calculations, equations, and graphing.

-develop inferences from basic data and design valid methods to test them

-apply scientific models, theories, and laws about the physical universe to a given situation

-use mathematical descriptions to analyze and graph motion, and apply forces and laws of motion to moving objects

-establish criteria and use scientific information to make appropriate decisions on the risks and benefits of technologies to society, and the environment

-demonstrate the ability to understand and communicate scientific concepts through the use of writing, appropriate diagrams, and hands on experiences

-explain simple phenomena in terms of energy transformations and phase changes

describe energy sources and energy types

-interpret wave energy as applied to fluid, sound and electromagnetic waves, including light.

-explain the behavior of light and radiation including reflection, refraction, absorption, and the phenomenon of color.

PHYSICS: Study of Matter and Energy and how they interact

CONTENT

Matter

Measurement

Speed

Graphing Motion

Acceleration (Kinematics)

Relative Motion

Relativity

Vectors (2 dimensions)

Projectile Motion

Forces (Dynamics)

Laws of Motion

Momentum

Energy

Energy Transformations

Heat Energy

(Thermodynamics)

Electricity

Pressure

Harmonic Oscillators (Waves)

Circular Motion

Sound Waves

Light Waves

Special Topics

SKILLS (THINKING)

Observing

Math Problem Solving

Experimental Design

Models

Applying

Writing

Research

Group Work

Decision Making

Communication