Physics

COURSE DESCRIPTION:

The goal of physics is to describe the physical world using a small number of basic assumptions, concepts, and equations. In this course, emphasis is placed on relating physics to the everyday world. Students explore the concepts involved with motion in one- and two-dimensions, forces, work and energy, momentum and collisions, circular motion and gravitation. They recognize the importance of the laws of thermodynamics. Students learn the characteristics of waves and describe the behavior of waves with emphasis on light and sound. They understand the relationship between electricity and magnetism. Finally, the students gain a simple understanding of atomic physics. Approximately 40% of the course involves virtual laboratory investigations. Some activities will require ordinary household items such as rulers, meter sticks, balls or marbles, string, paper and pencils. Part 1 focuses on understanding motion. Students learn kinematic equations and apply them to various situations. They explore forces, work and energy and apply these concepts in the special case of circular motion. Heat and the laws of thermodynamics are covered. Part 2 focuses on waves, in particular sound and light. The course then moves to understanding electricity and magnetism and the relationship between the two. It concludes with a basic exploration of atomic physics.

COURSE OBJECTIVES:

After completing the course, students will be able to:

- Explain the laws governing motion and interpret the equations governing motion
- Describe the effects of forces on the motion of objects
- Recognize that energy and momentum are conserved
- Analyze and explain the laws of thermodynamics
- Identify characteristics of waves and describe behaviors of waves
- Demonstrate the relationship between electricity and magnetism
- Explain simple examples of quantum physics
- Describe how physics influences everyday life
- Explain field and laboratory investigations using the scientific method
- Use critical thinking and scientific problem solving to make informed decisions

PREREQUISITES: Successful completion of Algebra II, Geometry also recommended

COURSE LENGTH: Two semesters

REQUIRED TEXT: None. Digital text book included in the course, ***Physics***, Holt 2006

COURSE OUTLINE:

Course Overview

- Course Introduction
- Getting Started
- Laboratories

Physics (continued)

COURSE OUTLINE (continued):

Physics and the Laws of Motion
- Physics and the Laws of Motion: Introduction
- Motion in One Dimension
- Two-Dimensional Motion and Vectors
- Forces and the Laws of Motion
- Exam Preparation

Energy and Motion
- Energy and Motion: Introduction
- Word and Energy
- Momentum and Collisions
- Circular Motion and Gravitation
- Exam Preparation

Heat and Thermodynamics
- Heat and Thermodynamics: Introduction
- Heat
- Thermodynamics
- Exam Preparation

Part 1 Exam

Waves
- Waves: Introduction
- Vibrations and Waves
- Sound
- Light
- Exam Preparation

Electricity
- Electricity: Introduction
- Electric Forces and Fields
- Electrical Energy and Current
- Circuits and Circuit Elements
- Exam Preparation

Magnetism and Atomic Physics
- Magnetism and Atomic Physics: Introduction
- Magnetism
- Electromagnetic Induction
- Atomic Physics
- Exam Preparation

Part II Exam