

## *Norwood Public Schools*

# **Honors Physics Curriculum Overview**

### **Description:**

The Honors Physics course explores the fundamental laws that govern the universe. Concepts such as velocity, acceleration, force, momentum, and energy are used to investigate motion, gravity, friction, pressure, heat, waves, and electromagnetism. Labs provide concrete demonstrations of physical principles. The curriculum prepares students for most SAT II Physics topics. Students make substantial use of Algebra 1 and Geometry to describe and predict action in the physical world. There will be significantly higher academic expectations of students in honors level courses.

### **Learning Experiences:**

- Students make observations, raise questions, and formulate hypotheses.
- Students independently read and comprehend scientific text.
- Students communicate and apply the results of scientific investigations: completion of formal lab reports.
- Students apply mathematical skills to solve problems using algebra, trigonometry, and geometry.
- Students communicate scientific ideas through writing.
- Students conduct hands-on and virtual laboratory experiments.

## Content Outline:

### Term 1

Foundation: Scientific methods, mathematical tools, measurement systems

Static equilibrium: balanced forces, vectors

Kinematics: position, displacement, velocity, and acceleration, 4 kinematic equations

### Term 2

Newton's 1<sup>st</sup> and 2<sup>nd</sup> Laws of Motion,  $F = ma$ , free-body diagrams

Newton's 3<sup>rd</sup> Law of Motion and Momentum, conservation of momentum

Gravity: Newton's Law, gravitational fields and gravitational acceleration

### Term 3

Projectile motion

Work, energy, and power: levers, potential and kinetic energy, conservation of mechanical energy

Friction

Circular motion: centripetal force, orbits

Pressure, density, and buoyancy

### Term 4

Thermal energy: measuring temperature, specific heat, thermal equilibrium, latent heats and phases of matter

Waves: frequency, wavelength, and velocity; sound; light and other electromagnetic radiation; reflection and refraction

Electric force and electric fields: electricity, circuits

Magnetism

## Resources Used:

- Serway and Faughn, *Holt Physics*, Holt, Rinehart and Winston, 1999.
- Hewitt, Paul, *Conceptual Physics*, Pearson Educational, 2009.
- Teacher generated text and problem sets

As of 3/21/12