



# Hampden Academy

Hampden Academy challenges all students to achieve individual excellence.

## College Prep Physics Course Syllabus

### Course Information

**Course Title:** COLLEGE PREPARATORY PHYSICS

**Course number:** 560

**Course Date:** This is a full year course meeting for 80 minutes, every other day during one semester and meeting 80 minutes every day during the other semester. One and half credits is earned upon completion of the course with a minimum grade of 70 and the passing of the graduation required standards.

**Course Location:** Room 317- Hampden Academy 3rd Floor

**Instructor:** Mrs. Danielle Johnson ([djohnson@rsu22.us](mailto:djohnson@rsu22.us))

**Course Description:** Physics is recommended for those students planning further study in any field of science, medicine, engineering or technology. Topics considered include the study of motion, energy, wave theory, magnetism, electricity and nuclear physics. A math proficiency test will be taken at the beginning of the school year. Prerequisite/Program: Algebra 2, Geometry

### Topics Covered:

#### **Mechanics**

- Ch 2: Motion in One Dimension
- Ch 3: Two-Dimensional Motion and Vectors
- Ch 4: Forces and the Laws of Motion
- Ch 5: Work and Energy
- Ch 6: Momentum and Collisions
- Ch 7: Circular Motion and Gravitation

#### **Thermodynamics**

- Ch 8: Fluid Mechanics
- Ch 9: Heat

#### **Waves**

- Ch 11: Vibrations and Waves
- Ch 12: Sound
- Ch 13: Light and Reflection
- Ch 14: Refractions

#### **Electromagnetism**

- Ch 16: Electric Forces and Fields
- Ch 17: Electrical Energy and Current
- Ch 18: Circuits and Circuit elements
- Ch 19: Magnetism
- Ch 20: Electromagnetic Induction

### **Standards:**

- Physical Science: Forces & Motion Level 06 - Newton's Second Law
- Physical Science: Forces & Motion Level 07 - Motion Graphs
- Physical Science: Forces & Motion Level 08 - Mass and Weight
- Physical Science: Forces & Motion Level 09 - Kinetic and Potential Energy
- Physical Science: Forces & Motion Level 10 - Force/Free Body Diagrams
- Physical Science: Forces & Motion Level 11 - Newton's Third Law
- Physical Science: Mechanical Systems Level 04 - Conservation of Energy
- Physical Science: Mechanical Systems Level 05 - Work and Power
- Physical Science: Mechanical Systems Level 06 - Angular Momentum
- Physical Science: Electricity & Magnetism Level 06 - Generators/Motors
- Physical Science: Electricity & Magnetism Level 07 - Ohm's Law

### **Learning Outcomes:**

1. **Physical Science: Forces & Motion Level 06 - Newton's Second Law** - Understands Newton's Second Law. Is skilled at calculating force, given mass and acceleration.
2. **Physical Science: Forces & Motion Level 07 - Motion Graphs**- Understand final velocity, initial velocity, displacement, and acceleration. Is skilled at using motion graphs (velocity, acceleration, and displacement/distance) to interpret motion.
3. **Physical Science: Forces & Motion Level 08 - Mass and Weight** - Understand the difference between mass and weight. Understand that gravity pulls on a mass to create weight and can calculate weight in terms of a force.
4. **Physical Science: Forces & Motion Level 09 - Kinetic and Potential Energy**- Understand the difference between potential and kinetic energy. Is skilled at calculating potential and kinetic energy and converting between the two.
5. **Physical Science: Forces & Motion Level 10 - Force/Free Body Diagrams**- Understand normal force, frictional force, tension, and downward force. Is skilled at using and calculating force and free body diagrams to solve problems.
6. **Physical Science: Forces & Motion Level 11 - Newton's Third Law**- Understand the conservation of momentum and Newton's Third Law. Is skilled at applying Newton's Third Law to everyday objects.
7. **Physical Science: Mechanical Systems Level 04 - Conservation of Energy**- Understand how to define the boundaries of system. Knows the units of energy. Know the formulas for kinetic and potential energy. Understand the formulas for energy use the same units as used to describe motion. Understand how kinetic and potential energy predict moPon of a complex system (e.g., car accident). Understand how to quantify kinetic and potential energy. Understands that all forms of energy (heat, light, electrical, kinePc, potenPal) are conserved and transformed in a system.
8. **Physical Science: Mechanical Systems Level 05 - Work and Power**- Understand the units of power and work; waU and joule. Understand the energy inputs and outputs of a system (for example: a car, iPod, cell phone). Understand the relationship between the concepts of work and power in a system. Is skilled at predicting or calculating mechanical advantage in simple machines using their inputs and outputs. Is skilled at calculating potential energy and work done

9. **Physical Science: Mechanical Systems Level 06 - Angular Momentum-** Understand the terms rotational energy, moment of inertia and angular velocity. Is skilled at calculating angular momentum in a closed system. Understand angular momentum of a closed system remains constant in both magnitude and direction.

10. **Physical Science: Electricity & Magnetism Level 06 - Generators/Motors-** Understand the terms electric field and magnetic field. Understand the interaction between electric and magnetic fields and the resulting forces (electromagnetic induction). Understand how most electricity is generated through the use of a generator/motor.

11. **Physical Science: Electricity & Magnetism Level 07 - Ohm's Law-** Is skilled at measuring current (amps), potential (volts), and resistance (ohms). AC/DC Understand the terms potential, current, resistance, and power. Is skilled at using Ohm's law ( $V=IR$ ) to calculate voltage, resistance and current.

### **Additional Topics & Science Skills:**

- Lab Safety
- Verbal and Written Scientific Communication
- Laboratory, Field and Analysis Techniques

### **Instructional Methods**

Methods: Lectures and class discussions, projects, online simulations, laboratory and experiments.

### **Supporting Materials**

Textbook Title: Physics, 2002-2006  
Publisher: Holt, Rinehart, and Winston  
Materials: Students should bring a writing utensil, notebook and their school-issued Chromebook to class each day.

### **Formative Assessment Tools**

These assessments will include in-class activities, problem/question sets, WebQuests, labs, and in-class group work.

### **Summative Assessments:**

Exams, some quizzes, projects, labs, and other assessments that demonstrate proficiency or conclude a learning target or standard.

### **Grading Policy**

Grades are calculated based on total points earned out of total possible points each quarter.

### **Late Work**

- Late is defined as work turned in after the *class period* it was due.
- Late assignments **will not be accepted after the assessment on that standard.**

