

Physics I

Levels: Academic, and Accelerated
Course Numbers 362 and 361, respectively.

Course Description:

The objective of physics is to improve scientific literacy by enabling students to analyze physical phenomena through the application of appropriate math concepts and skills. Models, both mathematical and physical, are used in the development of physical theory. Mathematical and symbolic language are used extensively in Physics I. Laboratory work requiring careful analysis is the starting point for the topics studied. The process of scientific inquiry is reinforced through its practice both in laboratory and in the development of theories. Physics requires above average ability in reading and mathematical reasoning. Students should be prepared to engage in problem-solving and analytical analysis. Topics that will be investigated include: motion, velocity and acceleration, Newton's laws, sound, light, and electricity. Students in standard and academic physics will study the same topics, with the emphasis in standard physics on the conceptual aspects of the course. Students in Accelerated Physics will cover these topics in more depth and also the additional topics of fluid and wave mechanics, magnetism, and nuclear physics.

Pre- or Co-requisite: Algebra II, for Academic Physics.

Pre- or Co-requisite: FST or Math Analysis, for Accelerated Physics.

Course Proficiencies:

The following is a list of skills and concepts students will be proficient in upon successful completion of this course. These proficiencies form the basis of assessment of each student's achievement. Students will be able to:

1. Demonstrate capability to collect, analyze, and report on data in a systematic and organized manner. (5.1/12 A-C; 5.3/12 A-D)
2. Employ a variety of research methods to prepare independent projects. (5.1/12 A-C; 5.3/12 A-D; 5.4/12 A-C)
3. Apply appropriate mathematical processes/skills to solve physics problems. (5.3/12 A-D)
4. Apply Newton's Laws to analyze real life systems. (5.2/12 B; 5.7/12 A1-2)
5. Compare the principles of velocity and acceleration. (5.7/12 A1)
6. Explain the interrelationship between the various forms of energy. (5.7/12 B2-4)
7. Demonstrate an understanding of vectors. (5.7/12 A)
8. Apply the principles of reflection and refraction to explain the functioning of lenses and mirrors. (5.7/12 B1)

9. Relate the physical properties of sound waves to the way we perceive sound. (5.7/12 B1)

10. Explain how electric charges are generated and transported. (5.7/12 A6-8, B1)

The following additional proficiencies are for the Accelerated sections:

11. Analyze collisions using concepts of impulse, plasticity, and conservation of momentum. (5.7/12 A1-2)

12. Expand knowledge of linear motion to rotational motion. (5.7/12 A1-2)

13. Describe the applications of electricity and magnetism. (5.7/12 A6-8, B4)

14. Describe the nature of thermal energy and its relationship to the structure of matter.

15. Apply Archimedes' and Bernoulli's Principles to practical situations. (5.2/12 B)

Note that after each course proficiency the NJ Core Content Curriculum (CCC) Standards and Cumulative Progress Indicators are referenced, for example proficiency #3 refers to 5.3/12 A-D. This notation is to indicate that proficiency #3 specifically addresses NJ State CCC Standard 5.3, Cumulative Progress Indicators at the 12th grade level for strands A-D.

Assessment:

A variety of evaluation tools will be used to determine student achievement in this course. Any or all of the following tools will be used:

- a. Tests and quizzes.
- b. Laboratory performance, reports, and journals.
- c. Class participation.
- d. Well-developed homework.
- e. Technology-based activities.
- f. Projects, including oral presentations.
- g. Self or peer assessment.
- h. Teacher observation.

Board Adopted Textbook:

All levels

Title:	Physics
Authors:	Zitzewitz, Davids, Guitry, Hainen, Kramer, Nelson,
Nelson	
Publisher:	Glencoe/McGraw-Hill
Copyright:	2002