

Astronomy

Level: Academic

Course Number 386.

Course Description:

The objective of astronomy is to improve scientific literacy by enabling students to analyze physical phenomena through the application of appropriate math concepts and skills. A strong conceptual understanding of motion, velocity & acceleration, and Newton's laws is recommended. Models, both mathematical and physical, are used in the development of physical theory. The process of scientific inquiry is reinforced through its practice both in laboratory and in the development of theories. Astronomy 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: seasons, solar systems, stars, and the evolution of the universe. This course is designed to emphasize scientific and critical thinking as well to provide general exposure to the research that astronomers perform. Astronomy is recommended to any student with a strong interest in physics.

Pre-requisite: any SPF High School science course.

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 astronomical problems. (5.3/12 A-D)
4. Apply Newton's Laws to analyze astronomical 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. Analyze collisions using concepts of impulse, plasticity, and conservation of momentum. (5.7/12 A1-2)
8. Expand knowledge of linear motion to rotational motion. (5.7/12 A1-2)
9. Explain the interaction of the Earth, Moon and Sun to control eclipses, tides, and seasons. (5.9/12A)
10. Understand the dynamic interrelationship of the sun and planets in the origin and development of solar systems. (5.9/12B)
11. Understand the life cycle of stars. (5.9/12C)
12. Explain current theories of the evolution of the universe. (5.9/12D)

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:

Title: Astronomy Today, 5th edition.
Authors: Chaisson and McMillan
Publisher: Pearson/Prentice Hall
Copyright: 2005