

#341 – Chemistry I **Grades: 10-11** **Level: Accelerated** **Year: 5X** **Credits: 5**

Prerequisite: Algebra I and Geometry, minimum levels Accelerated and Academic

This course places a heavy emphasis on quantitative relationships. All chemistry sections employ a mathematical approach to broad areas of the course. The student must be comfortable in solving word problems. Accelerated chemistry requires a high reading and reasoning ability and strong proficiency with algebra. Approximately one-fifth of the instructional time is used in the laboratory where data is collected from which generalizations can be drawn.

#342 – Chemistry I **Grades: 10-12** **Level: Academic** **Year: 5X** **Credits: 5**

Prerequisite: Algebra I

This course is similar to Accelerated in approach. Expectations of the students are appropriately demanding and require proficiency with algebra. Emphasis is placed on helping the students in understanding the concepts of chemistry. Students successfully completing this course would be well prepared for college chemistry. Approximately one-fifth of the instructional time is used in the laboratory where data is collected from which generalizations can be drawn.

#343 – Chemistry I **Grades: 10-12** **Level: Standard** **Year: 5X** **Credits: 5**

Prerequisite: Algebra I

This course provides a general introduction to chemistry and is similar to academic chemistry in content with more time spent on fundamental concepts. Problem-solving involves both arithmetic and algebraic skills. Approximately one-fifth of the instructional time is used in the laboratory where data is collected from which generalizations can be drawn.

#344 – Forensic Chemistry **Grades: 11-12** **Level: Academic** **Year: 5X** **Credits: 5**

Prerequisite: Biology I and Chemistry I

The Forensic Chemistry course is a second year chemistry course. The new course will be case-study and lab/activity-based and will integrate principles from both Biology I and Chemistry I. Students will be performing ‘CSI’- like investigations that reinforce and extend the concepts they learned in Chemistry I.

#350 – Chemistry II: AP **Grades: 11-12** **Level: Accelerated** **Year: 8X** **Credits: 8**

Prerequisite: Chemistry I and meet AP entrance guidelines

This is a second year chemistry course designed to be the equivalent of the general chemistry course usually taken in the first year of college. This course differs qualitatively from the first year chemistry course with respect to the level of textbook used, the topics covered, the emphasis on chemical calculations, the mathematical formulation of principles, and laboratory work. Students electing this course are expected to have excellent mathematical skills and be prepared to spend the appropriate amount of time preparing homework, in problem-solving activities, laboratory and general study. It should be recognized that course objectives and proficiencies are focused on the student taking and being successful on the Advanced Placement Chemistry examination and students are further encouraged to accept the challenge of this examination. Students must be prepared to begin class at 7:47 am every day and continue through until the end of period 1.

#371 – Nutrition Science **Grades: 11-12** **Level: Accelerated** **Year: 5X** **Credits: 5**

Prerequisites: Biology and Chemistry.

In today’s society there is a need for nutrition education. Studies have shown that diet has a high correlation as a contributing factor in the development of many illnesses. Thus, current topics dealing with proper nutrition and human physiology will be examined by the student. Since the student is exposed to many false claims and fads regarding what are considered to be good nutrition, a science course dealing with the biochemistry of food and emphasizing critical thinking and decision making skills is appropriate. This course is laboratory based and will prepare the student for future scientific endeavors at higher educational levels.

#371 – Nutrition Science (Continued)**Grades: 11-12 Level: Accelerated Year: 5X Credits: 5**

The accelerated level of this course will emphasize the chemistry of the major nutrients as well as additives to foods. The physiological response to proper nutrition, deficiency diseases and diet changes throughout the life cycle will also be explored. From time to time, foods and the resulting nutritional habits of other cultures may be studied to enrich and expand student experiences. The proficiencies of the course will be supported by text assignments and group experiences testing and analyzing various nutrients, additives and biochemical reactions. Students will demonstrate understanding of inquiries through written lab reports. Current topics in nutrition will also be explored through independent or cooperative group research projects.

#372 – Nutrition Science**Grades: 10-12 Level: Academic Year: 5X Credits: 5****Prerequisite:** Biology

This course is similar in approach to Accelerated Nutrition Science. Principles studied in this course will also lay a foundation for possible future science course work. This academic level course will emphasize the recognition of the scientific concepts behind the popular media presentation of such topics as major nutrients, food additives, and body responses to nutrition, diets and dieting, wellness and establishing a positive lifestyle. Student learning is supported by the use of journal articles, teacher-generated handouts, computer assisted activities, internet sources, group presentations and laboratory experiences.

#361 – Physics I**Grades: 11-12 Level: Accelerated Year: 5X Credit: 5****Prerequisites:** Algebra I, Geometry and Algebra II, AND Pre- OR Co-requisite: FST or Math Analysis

Physics emphasizes the mathematical and theoretical interrelationships of matter, space and time. Mathematical and symbolic language are extensively used. Laboratory work requiring careful analysis is the starting point for the topics that are studied. The process of scientific inquiry is learned through application and practice both in the laboratory and in the building of theory in the classroom. Physics requires above average ability in reading and mathematical reasoning in both algebra and geometry. Physics is often recommended for students who plan to study science, mathematics or engineering at the university level. Topics which will be under investigation include motion, velocity and acceleration, free falling bodies, forces, Newton's laws, work/power/energy, fluids, wave mechanics, sound, color, light - mirrors, refraction - lenses, electrostatics, electricity and circuits, magnetism, electromagnetism and induction, and topics in nuclear physics.

#362 – Physics I**Grades: 11-12 Level: Academic Year: 5X Credits: 5****Pre- OR Co-requisite:** Algebra II

Physics is applied math; students must have strong proficiency with both algebra and geometry to be successful in physics. Models, both mathematical and physical, are used in the development of physical theory. Mathematical and symbolic language are extensively used. Laboratory work requiring careful analysis is the starting point for the topics that are studied. The process of scientific inquiry is learned through its practice both in the laboratory and in the building of theory. Physics requires above average ability in reading and mathematical reasoning. Some topics, which will be investigated, include but are not limited to motion, velocity and acceleration, Newton's laws, fluid and wave mechanics, sound, color and light, reflection, refraction, electricity and magnetism, and selected topics in nuclear physics.

#360 – Physics II: AP Grade: 12 Level: Accelerated Year: 8X Credits: 8

Prerequisites: Physics I, Math Analysis and meet AP entrance guidelines

Advanced Placement Physics is a second year course designed to be the equivalent of the first year general physics course taken in college. This course will include the in-depth study of Newtonian mechanics, thermodynamics, wave mechanics including light and sound, magnetism and electricity and nuclear physics. It should be recognized that course objectives and proficiencies are focused on the student taking and being successful on the Advanced Placement Physics examination and students are encouraged to accept the challenge of the examination. Students will be involved in extensive laboratory investigations that support class discussion, problem solving and application. Students must be prepared to begin class at 7:47 am every day and continue through until the end of period 1.

#380 – Research in Science Grades: 11-12 Level: Accelerated Year: 5X Credits: 5

Prerequisites: Enrollment is based upon successful completion of Biology I, Algebra I, and Chemistry I (or concurrent enrollment in same), and prior approval of instructor.

The content of the course includes such topics as: information searches using traditional library methods as well as the internet; communicating with scientists and other students via e-mail; participation in the “Waksman Challenge” and/or other internet research competitions; in-depth practice of the scientific method from framing a research problem through analyzing the data gathered through experimentation; writing a research paper and making a poster/technology presentation. Emphasis will be given to biotechnology projects using a variety of organisms.

Background information and techniques will be taught as needed for the projects and it is anticipated that course objectives and proficiencies may expand as experiences are gained working with the program. It is expected that students will work beyond the classroom, researching information from appropriate sources.

All students are expected to prepare a formal research and poster/technology presentation. Participation in activities sponsored by the Waksman Institute is expected and participation in science fair competitions will be encouraged.

#385 – Zoology and Animal Behavior Grades: 10-12 Level: Academic Year: 5X Credits: 5

Prerequisite: Biology I and Chemistry I

Zoology is a biological science that reinforces and extends the central concepts of Biology I using the animal kingdom as a content focus. To be successful, students should have a strong understanding of ecology, cell biology, and genetics. These concepts will be used as a foundation to explore the evolution and diversity of the animal kingdom and provide a basis for comparative anatomy and physiology. This course is designed to emphasize scientific and critical thinking as well to provide general exposure to the research that zoologists perform. Zoology is recommended to any student with a strong interest in biology.

#386 – Astronomy Grades: 10-12 Level: Academic Year: 5X Credits: 5

Prerequisite: Successful completion of at least one high school science course.

This is an integrated science course studying outer space: universe, stars, planets, solar system, and space travel. The course utilizes case studies and laboratory exercises to develop critical thinking skills and to facilitate the learning of important physical science themes. Students will learn about classical astronomy as well as new discoveries in astronomy. This course is recommended to any student with a strong interest in physics

Aerospace Science

Air Force Junior Reserve Office Training Corp

(AFJROTC)

NJ-821

College Credits for Cadets

University of Colorado at CO Springs

- **Cadets can earn up to 8 college credits
(Nominal Fee for college credit)**

AFJROTC students have [No Military Obligation](#).

The Air Force Junior ROTC program is offered to all high school students without exception and is designed to provide the cadets with Aerospace Science, Leadership, Drill, and Communication curriculum. Our program is especially beneficial to students that aspire to attend college or pursue careers in aviation; over the cadet's four year high school career they build a very impressive resume of community service. Cadet's continuing their educational pursuits have the opportunity to receive letters of recommendation from the communities federal, state, and local politicians.

This programs objective is to instill:	What our cadets can gain from this program:
• Values of Citizenship	• Community Service Involvement
• Patriotism	• College Scholarships
• Personal Responsibility	• Public Recognition
• Sense of Accomplishment	• Self Confidence
• Respect for Authority	• Aerospace Science Knowledge
• Good Personal Appearance	• Friends
• Honorable Behavior	• Fun

Aerospace Science/Leadership Faculty

- MSgt Don J. Fessenden, retired AF medic, and PME instructor, MBA
Email: dfessenden@spfk12.org

Please refer any AFJROTC program question to MSgt Don Fessenden (ret), Aerospace Science Instructor.

Curriculum

Aerospace Science

Biology in Aerospace

- Flight Basics, Human Requirements of Flight, Aerospace Environment, Space Programs, Human Requirements in Space, Space Technology

Science of Flight

- Aerospace Environment, Flight Weather, Principles of Aircraft Flight, Principles of Navigation

Frontiers of Flight

- Heritage of Flight, Development of Air Power, Military Aerospace, Careers in Aviation

Aerospace Management

- Management of AFJROTC, Instruction of Cadets

Leadership

Leadership

- Customs and Courtesies, Flag Etiquette, Citizenship, Attitude, Discipline, Study Habits, Followership, Leadership, Drill, Teamwork

Life Skills

- Unlocking Your Potential, Financial Management, Dynamics of Human Behavior, Sexism, Prejudice, Leadership Concepts, Building Teamwork

Career Development

- Applying for Admission to College, Job Search, Resume Writing, Career Opportunities, Stress Management, Ethics, Decision Making

AFJROTC Activities

- Promotion, Awards Ceremonies, Military Ball
- Color Guard and Honor Guard Teams
- Field Trips – Picnic
- Community Service Projects

Summer Leadership School (Camp)

- This program is held at different locations throughout New Jersey at the beginning of summer break. This is a 10 day long in residence leadership camp. There is a nominal fee attached to this program that will be collected prior to the last day of school.

Scotch Plains-Fanwood AFJROTC:

“Raising the Academic Bar while developing tomorrows Leaders Today!”

#351 – Aerospace I

Grade: 9

Level: 0

Year: 5X

Credits: 5

This course is an integration of two separate courses, Aerospace Science I and Leadership I*, that are taught concurrently using a “teamed” approach.

The **Aerospace Science** component of this course stresses the physiological requirements for atmospheric and space flight, including an overview of survival in hostile environments.

The **Leadership I** component is designed to acquaint the students with the aerospace age, to develop informed citizens, strengthen and develop character, promote an understanding of our role as citizens in a democratic society, to provide information on the various careers in the United States Air Force, and to develop future leaders for our country. They will learn about the AFJROTC mission, importance and organization of the Cadet Corps, cadet rank structure, how to wear the Air Force uniform, and military customs and courtesies. The students will be introduced to leadership and management concepts, personal management characteristics, leadership styles, communicative skills, drill and ceremonies. Additional instruction will produce an awareness of U.S. flag etiquette, attitude and discipline, self-worth and basic drill maneuvers.

#352 – Aerospace II

Grade: 10

Level: 0

Year: 5X

Credits: 5

This course is an integration of two separate courses, Aerospace Science II and Leadership II*, that are taught concurrently using a “teamed” approach.

The **Aerospace Science** component of this course covers the sciences involved with aerospace. It includes the aerospace environment encompassing the physical composition of the atmosphere. Forces are also studied that create lift and drag such as gravity and thrust. Aircraft navigation is explored including a study of flight/navigation instruments and aids. Basic familiarity with a flight simulator is developed.

