SCIENCE

EARTH SPACE AND ENVIRONMENTAL SCIENCE (8795) 5 credits Grade 9

This course is limited to those students who have an **Individualized Education Program (IEP)** developed with the Child Study Team. Earth Space and Environmental Science (ESES) is designed for ninth grade students as the first course of a three-year science requirement. Topics include but are not limited to as follows: earth systems, including interior and exterior structure and forces; space systems including big bang theory, solar weather, star evolution, and nucleosynthesis; environmental science Disciplinary Core ideas with integration of NGSS Cross-Cutting Concepts and NGSS Science and Engineering Practices. ESES builds on previous knowledge obtained from Middle School Next Generation Science Standards.

EARTH SPACE AND ENVIRONMENTAL SCIENCE (5510) 5 credits (Lab) Grade 9

Earth Space and Environmental Science (ESES) is designed for ninth grade students as the first course of a three-year science requirement. Topics include but are not limited to as follows: earth systems, including interior and exterior structure and forces; space systems including big bang theory, solar weather, star evolution, and nucleosynthesis; environmental science Disciplinary Core ideas with integration of NGSS Cross-Cutting Concepts and NGSS Science and Engineering Practices. ESES builds on previous knowledge obtained from Middle School Next Generation Science Standards.

BIOLOGY (8125) 5 credits Grades: 10-12

This course is limited to those students who have an **Individualized Education Program (IEP)** developed with the Child Study Team. This course is a basic study of the biological concepts as outlined in the Science content standards. Topics include but are not limited to the characteristics of living and nonliving things, cell structures and functions, cellular energy, cellular reproduction in addition to genetics. Students will develop a variety of learning techniques such as note taking, group discussions, class lab exercises, project development, cooperative learning, supplemental readings, and short research papers. The student's individual educational program will determine the level of instruction and the goals for successful completion. ***NOTE: Students are required to take the NJ Biology Competency Exam***

COLLEGE PREP BIOLOGY (5275) 5 credits (Lab) Grade 10

Prerequisite: Comprehensive Science

This Biology course is for students planning to attend college, technical or trade school. It is a basic survey study of biological concepts. Topics include but are not limited to the characteristics of living and nonliving things, cell structures and functions, cellular energy, cellular reproduction in addition to genetics. Students will develop a variety of learning techniques such as note taking, group discussions, class lab exercises, project development, cooperative learning, supplemental readings, and short research papers. ***NOTE: Students are required to take the NJ Biology Competency Exam***

COLLEGE PREP BIOLOGY (5210) 6 Credits (Lab) Grade10

Prerequisite: Comprehensive Science

This laboratory course meets six times per week, is intended for the student who plans to attend college and is designed to help students gain an understanding of how the study of living things has developed through the use of investigation and observation. Topics include characteristics of living and nonliving things, cell structures and functions, cellular energy, cellular reproduction in addition to genetics as it relates to basic and complex patterns of inheritance and premises in genetic engineering. Students will develop a variety of learning techniques such as note taking, group discussions, class lab exercises, project development, cooperative learning, supplemental readings, and short research papers. ***NOTE: Students are required to take the NJ Biology Competency Exam***

HONORS BIOLOGY (5225) 6 credits (Lab) Grade 9-10

Corequisite: Geometry or Honors Geometry
Prerequisites:

a. Minimum grade of "A" or "B" in 8th grade science **OR**
b. Minimum grade of "A" in Comprehensive Science
c. Teacher recommendation for 8th grade students

This laboratory course meets six times per week and is designed to introduce and subsequently immerse students into the process of learning about the biochemistry of cells, cellular biology, genetics, biotechnology, ecology and human impact issues. Honors Biology integrates the laboratory science by providing fundamental lab safety guidelines and techniques as it relates to the foundations of life sciences. Required knowledge of course content is often detailed and demanding. Significant independent study and memorization is expected for the mastery of the content. Topics included but not limited to are as follows: cell structure and function, laws of thermodynamics, photosynthesis and cellular respiration, cell cycle and mitosis, asexual and sexual reproduction, meiosis, Mendelian genetics, complex inheritance and human heredity, pedigree and karyotype analysis, molecular genetics, transcription and protein synthesis, biotechnology, theory of evolution, bacteria, protists, and viruses and ecosystems. Teaching and learning techniques/strategies emphasized are: note taking, group discussions, lab exercises/reports, projects, cooperative learning, supplemental readings, ***POGIL*** activities and short research papers. ***NOTE: Students are required to take the NJ Biology Competency Exam***

ADVANCED PLACEMENT BIOLOGY (5230) 10 Credits Grade 11-12

Prerequisites:

a. Honors Biology with a minimum final grade of "B" OR teacher recommendation
b. Honors Chemistry with a minimum final grade of "B" OR teacher recommendation

This rigorous laboratory course meets for two periods per day and is comparable to the first semester of college biology.
The course consists of four "Big Ideas" set forth by the College Board for the AP Biology Course. The Big Ideas are as follows:
Big Idea 1: The process of evolution drives the diversity and unity of life.
Big Idea 2: Biological systems utilize free energy and molecular building blocks to grow, to reproduce, and to maintain dynamic homeostasis.

Big Idea 3: Living systems store, retrieve, transmit, and respond to information essential to life processes.
Big Idea 4: Biological systems interact, and these systems and their interactions possess complex properties.

Students are encouraged to take the AP Biology Exam. College credit may be awarded to the student depending on the specific university/college requirement exam score for credit. Preliminary summer work will be required.

HONORS ANATOMY & PHYSIOLOGY (5677) (Elective) 5 Credits (Lab) Grade 11-12

CAP course - BCC (4 credits) Fundamentals of A&P I Bio 110/111

Prerequisites:

a. Honors Chemistry minimum final grade of "C" OR
b. College Prep Chemistry and College Prep Biology minimum final grades of "B"

The Anatomy and Physiology course is the study of the interrelationship between the structure and function of the human body. The course is designed for the college bound student planning to embark on a career in a medical or allied health field. The ability to develop and recall a large technical vocabulary and retaining a large volume of detailed information is essential for success in this course. Anatomy and Physiology I will cover the following topics: Human Body Orientation, Cell Structure and Function, Histology, Homeostasis, and the following body systems: Integumentary, Skeletal, Muscular, Nervous and Special Senses. Students are expected to complete daily homework assignments and study extensively in order to prepare for tests and lab practicals. Students will also write four individual and independent research papers on a homeostatic disorder with a correctly formatted reference page. The research papers will be presented to the class for peer and instructor evaluation and accompanied by original visual enhancement created by the student using Power Point, Prezi or a 36" X 48" display board. Anatomy and Physiology is designed either as an elective or as a course to fulfill the three year science requirement upon completion of the pre-requisites.

NUTRITION AND THE HUMAN BODY (8257) 5 credits (Elective) (LAB) Grades: 11-12

Prerequisites:

a. Biology
b. Chemistry

This course is limited to those students who have an **Individualized Education Program (IEP)** developed with the Child Study Team. Nutrition and the Human Body is designed as an elective centering on the importance of implementing the USDA's Dietary Guidelines for Americans 2010 and to maintain/achieve healthy living for an individual and community in addition to the prevention of chronic illnesses. The role of diet and nutrition in growth, development, maturation, and aging throughout the stages of life (preconception through late adulthood) are examined. The major focus reflects the importance of each nutrient based upon its biochemical and physiological functions. The relationship of nutrition and major health problems in the United States, such as: obesity, cardiovascular disease, and cancer are examined. The course builds upon the principles of nutrition as they relate to chemistry, metabolism, and the anatomy/physiology of the human body. Topics such as digestion and absorption of nutrients, chemical structure and metabolic fate of nutrients, the effects of over- and under-nutrition on individuals and the community at large will

be studied. The course will also emphasize individual, clinical, social and applied aspects of nutrition, including food labeling, diet analysis, weight management, food safety and food security (hunger as a social justice issue). THIS IS NOT A COURSE THAT WILL HAVE ACTIVITIES CONCENTRATING ON THE TASTING AND ANALYZING OF FOODS & BEVERAGES!

NUTRITION AND THE HUMAN BODY (5695) (Elective) 5 credits (Lab) Grades: 11-12

Prerequisites:

a. Biology
b. Chemistry

Nutrition and the Human Body is designed as an elective centering on the importance of implementing the USDA's Dietary Guidelines for Americans 2010 and to maintain/achieve healthy living for an individual and community in addition to the prevention of chronic illnesses. The role of diet and nutrition in growth, development, maturation, and aging throughout the stages of life (preconception through late adulthood) are examined. The major focus reflects the importance of each nutrient based upon its biochemical and physiological functions. The relationship of nutrition and major health problems in the United States, such as: obesity, cardiovascular disease, and cancer are examined. The course builds upon the principles of nutrition as they relate to chemistry, metabolism, and the anatomy/physiology of the human body. Topics such as digestion and absorption of nutrients, chemical structure and metabolic fate of nutrients, the effects of over- and under-nutrition on individuals and the community at large will be studied. The course will also emphasize individual, clinical, social and applied aspects of nutrition, including food labeling, diet analysis, weight management, food safety and food security (hunger as a social justice issue). THIS IS NOT A COURSE THAT WILL HAVE ACTIVITIES CONCENTRATING ON THE TASTING AND ANALYZING OF FOODS & BEVERAGES!

COLLEGE PREP CHEMISTRY (8130) 5 credits (Lab) Grade 11 & 12

This course is limited to those students who have an Individualized Education Program (IEP) developed with the Child Study Team. This course provides a general overview of the principles of chemistry from an experimental perspective. Topics covered include atomic structure, chemical formulae and reactions, phases of matter, colligative properties, acids and bases, and electrochemical, thermal, nuclear, and organic chemistry. Students will have the opportunity to participate in lab experiences via quarter investigations and projects related to the above listed topics. The student's individual educational program will determine the level of instruction and the goals for successful completion.

COLLEGE PREP CHEMISTRY (5610) 5 credits (Lab) Grade 11

Prerequisites:

a. Algebra I
b. Biology

This course is for students planning to attend college, technical or trade school. This course provides a general overview of the principles of chemistry from an experimental perspective. Topics covered include atomic structure, chemical formulae and reactions, phases of matter, colligative properties, acids and bases, and electrochemical, thermal, nuclear, and organic chemistry. Students will have the opportunity to participate in lab experiences via investigations and projects related to the above listed topics.

COLLEGE PREP CHEMISTRY (5620) 6 credits (Lab) Grades 10-12

Prerequisites: College Prep OR Honors Biology
Corequisite: Algebra II

This laboratory course meets six times per week and is a more in-depth survey study of chemistry concepts. It is for the student who plans to attend college and is confident and has proven ability with the math and science concepts in Algebra I, Physical Science, Geometry, and Biology. In addition, must be concurrently enrolled in Algebra II. Topics include basic chemistry theories, principles, laboratory techniques and related calculations linked to atomic structure, chemical formulae and reactions, phases of matter, colligative properties, acids and bases, and electrochemical, thermal, nuclear, and organic chemistry. All students are expected to complete daily reading and/or problem solving assignments.

Note: A calculator will be used throughout this course. Calculators are available to use during class. Students are encouraged to purchase a scientific or graphing calculator for work to do at home. Your teacher will inform you as to which calculator to purchase.

HONORS CHEMISTRY (5660) 6 credits (Lab) Grades: 10-12

Prerequisites:

a. Honors Geometry with a minimum final grade of "B" OR College Prep Geometry with a minimum grade of "A"
b. Honors Biology with a minimum final grade of "B" OR College Prep Biology with a minimum grade of "A"

Corequisite:

a. Honors Algebra II

This laboratory course meets six periods per week and is intended to prepare students for a college level general chemistry or advanced placement high school chemistry course. It is designed for those who plan a career in science, engineering or math. Most students will need to spend a considerable amount of time outside of class solving problems, conducting research and preparing laboratory reports. Honors Chemistry is a challenging math-based problem solving course involving laboratory and lecture. Heavy emphasis is placed upon analysis and synthesis skills. Reference materials such as Reactivity Series, Reduction Potentials, Solubility Guidelines, and Standard Enthalpies, as well as many Periodic values are incorporated as integral tools. Major topics include atomic structure, stoichiometric analysis, gas laws, solutions, kinetics and thermodynamics, as well as acid/base, electro-, nuclear and organic chemistry. Why study chemistry? Chemistry plays an integral role in our daily lives, and is the fundamental building block for all other areas of science. Furthermore, chemistry has many relevant applications to our lives and world including: cooking, medicine, pharmaceuticals, industry, and biotechnology.

Note: A calculator will be used extensively throughout this course. Calculators are available to use during class. Students are encouraged to purchase a scientific or graphing calculator for work to do at home. Your teacher will inform you as to which calculator to purchase.

ADVANCED PLACEMENT CHEMISTRY (4680) (Elective) 10 credits (Lab) Grades: 11-12

Prerequisites:

a. Honors Chemistry with a minimum final grade of "B"OR College Prep Chemistry with a minimum grade of "A"
b. Honors Algebra II with a minimum final grade of "B" OR College Prep Algebra II with a minimum grade of "A"

This rigorous laboratory course meets for two periods per day and is comparable to the first semester of college chemistry. The pace is rapid, and will cover extensive topics in the structure of the atom, the periodic table, nuclear chemistry, chemical equilibrium, organic chemistry, etc. Laboratory experiences to include written research/lab reports are major components of the course. Students are encouraged to take the AP Chemistry Exam. College credit may be awarded to the student depending on the specific university/college requirement exam score for credit. Preliminary summer work will be required.

Note: A calculator will be used extensively throughout this course. Calculators are available to use during class. Students are encouraged to purchase a scientific or graphing calculator for work to do at home. Your teacher will inform you as to which calculator to purchase.

FORENSIC SCIENCE (8790) (Elective) Credit: 5 Grades: 11-12

This course is limited to those students who have an **Individualized Education Program (IEP)** developed with the Child Study Team. This course is a basic introduction to criminal justice and crime scene investigation. This course provides an introduction to criminal justice and crime scene investigation. Students will explore the various areas that make up the broad category known as forensic science. These areas include analysis of biological, chemical, psychological and physical evidence. Forensic Science is designed either as an elective or as a course to fulfill the three year science requirement upon completion of the prerequisites.

FORENSIC SCIENCE (5685) (Elective) Credit: 5 (Lab) Grades: 11-12

Prerequisites:

a. Biology with a minimum final grade of "C"
b. Chemistry with a minimum final grade of "C"

This course provides an introduction to criminal justice and crime scene investigation. Students will explore the various areas that make up the broad category known as forensic science. These areas include analysis of biological, chemical, psychological and physical evidence. Students will be introduced to crime scene analysis and techniques through the study of subtopics such as: hair, fibers, fingerprints, DNA, blood spatter, toxicology, anthropology, pathology, soil analysis, forgery, glass analysis, impressions and ballistics. Guest speakers will add a high level of realism

to the experience, while case studies will specifically illustrate how forensic scientists increase the probative value of evidence. Forensic Science is designed either as an elective or as a course to fulfill the three year science requirement upon completion of the prerequisites.

COLLEGE PREP PHYSICS (5490) Credits 6 (Lab) Grades: 11-12

Prerequisites:

a. College Prep Chemistry
b. Algebra II

Corequisite:

a. Algebra II (if not previously taken)

This laboratory course meets six periods per week and is a math-based problem solving course requiring skillful employment of algebraic techniques and geometric/trigonometric relationships. This course provides a systematic introduction to the main principles of physics and emphasizes the development of critical thinking skills and problem solving techniques. The course is designed for the student who plans on attending college and has an interest in science but is not necessarily planning a career in science.

Note: A calculator will be used extensively throughout this course. Calculators are available to use during class. Students are encouraged to purchase a scientific or graphing calculator for work to do at home. Your teacher will inform you as to which calculator to purchase.

HONORS PHYSICS (5500) Credits 6 (Lab) Grades: 11-12

Prerequisites:

c. Honors Chemistry OR College Prep Chemistry with a minimum grade of "B"
d. Honors Algebra II and/or Honors Pre-Calculus OR Algebra II with a minimum grade of "B"

Corequisite:

b. Algebra II (if not previously taken)

This laboratory course meets six times per week and is a challenging math-based problem solving course requiring skillful employment of algebraic techniques and geometric/trigonometric relationships. Course material is oriented toward students who are planning a career in science, engineering or mathematics. Honors Physics addresses two broad topics of study, motion and energy. Divided between the Fall and Spring semesters, Newtonian motion encompasses linear and circular motion with such topics as vectors, forces, acceleration, work, momentum, collisions, and equilibrium, while the electromagnetic spectrum of energy is studied from basic waves to sound, light, electricity and then magnetism. Why study physics? For those who are able to solve mathematical puzzles, physics is everywhere and physics is fun. Physicists are versatile and adaptable problem solvers. They work in a wide range of interesting places from subatomic research facilities to NASA. Physicists create, observe, interpret, and predict in settings spanning inner-space, outer-space and cyberspace.

Note: A calculator will be used extensively throughout this course. Calculators are available to use during class. Students are encouraged to purchase a scientific or graphing calculator for work to do at home. Your teacher will inform you as to which calculator to purchase.