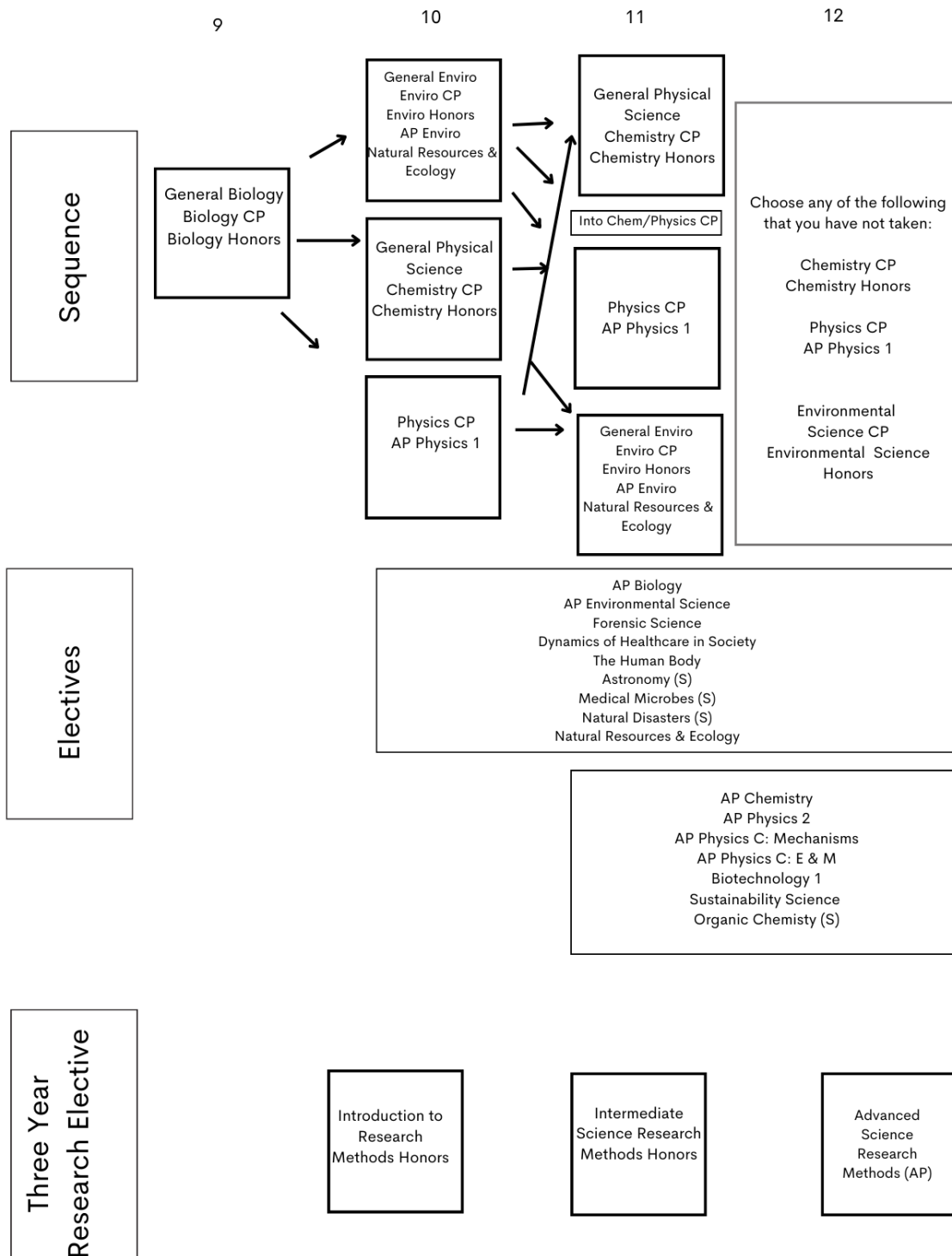
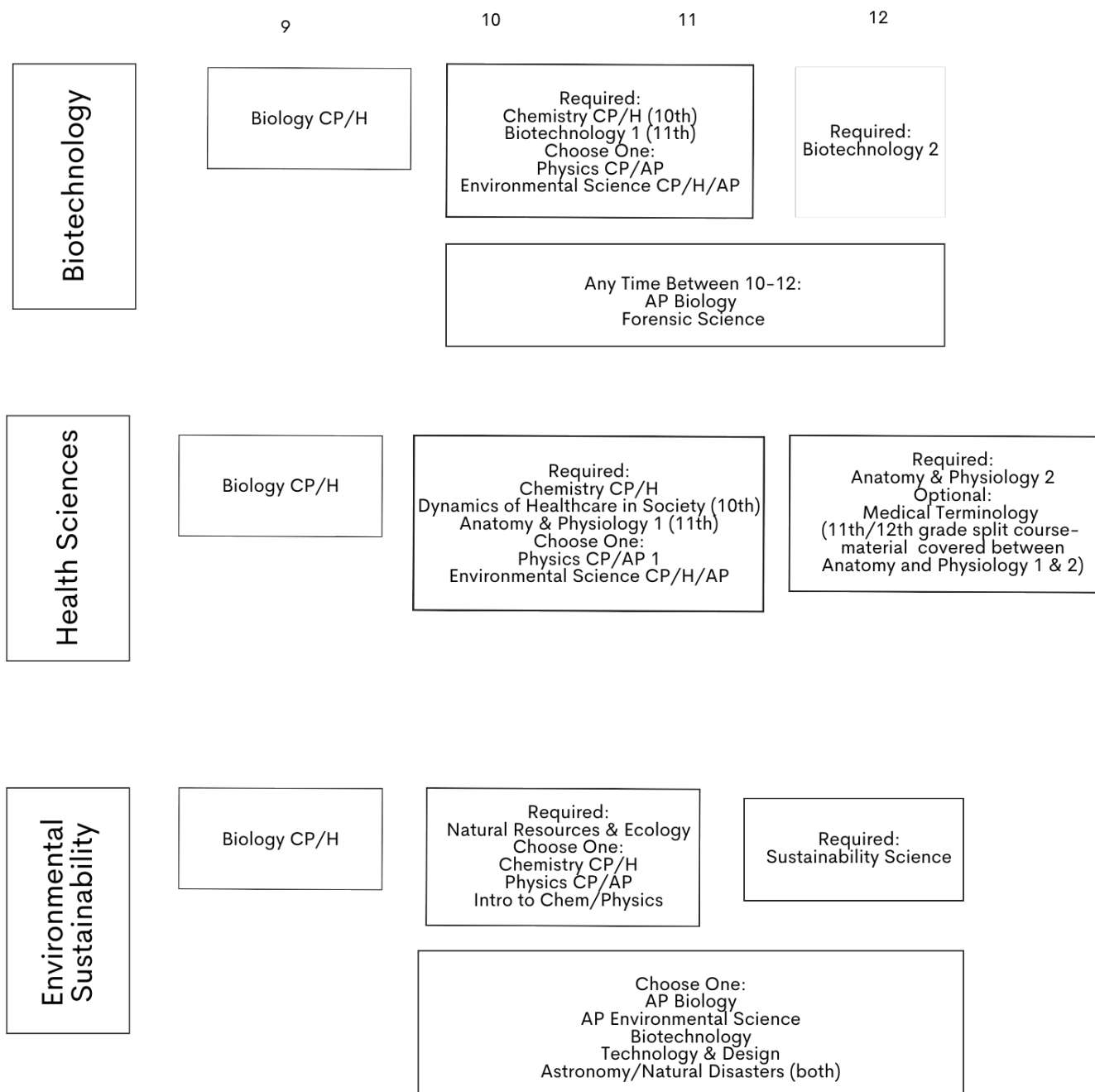


Course Sequence for Science



Science Career Pathways

***Note: these represent completion of entire pathways. The first course in each sequence is open to all students from 10th grade on.**



Science

GENERAL BIOLOGY (474) Prerequisite: This course is assigned at the recommendation of the Child Study Team and is a Resource Center Level course.	6 Credits Full Year Grade 9
This course is designed to fulfill the New Jersey State Graduation requirement for science. The curriculum includes topics such as: skills and tools of the biological scientist, basic chemistry and biochemistry, cellular organization and processes, molecular processes, genetics and genetic technology, evolution, ecology, classification and the physiology of the human body. The goals and objectives identified in each student's IEP will be addressed throughout this course.	

BIOLOGY CP (422) Prerequisite: None.	6 Credits Full Year Grade 9
Biology is the study of life. Biology CP is designed to provide students with the scientific principles, concepts and methodologies required to understand the relationships between the structure and function of living things. Students will incorporate prior knowledge to build an understanding of how structure leads to function in living things. This course will explore the science and societal connections of humans and the interaction with the environment. Students will be engaged by authentic, real-life scientific phenomena. This course provides students with the sufficient background in biology necessary to take future electives. The curriculum will address the needs of all learners through an interesting, problem-based approach to learning about living things.	

BIOLOGY HONORS (410) Prerequisite: None.	6 Credits Full Year Grade 9
Completion of a summer assignment is required for this course. Biology Honors is designed to provide the highly motivated student with the scientific principles, concepts, and methodologies required to understand the relationships between the structure and function of living things. This curriculum includes topics such as origins of life, molecular processes, genetics and genetic technology, evolution, ecology, human impact, and the study of select human body systems. This course moves at a faster pace than Biology College Prep (422) and covers a greater depth of information requiring students to have excellent work habits and independent study skills. This course is highly recommended for those wishing to take AP Biology.	

GENERAL PHYSICAL SCIENCE (475) Prerequisite: This course is assigned at the recommendation of the Child Study Team and is a Resource Center Level course.	6 Credits Full Year Grades 10-12
The General Physical Science course has been designed to develop an understanding of the relationship between matter and energy. This course is not intended to include all of the concepts taught in physics and chemistry, but provides a solid foundation in the major topics taught in both courses. Goals of this course include assisting students to become better problem solvers while they learn relationships and patterns among events and processes in the physical world. The topics covered in this course include the interactions between particles and substance, nuclear chemistry, waves and mechanics. Throughout the course students learn to engage in and interact with concepts in a way that is contextualized using real issues in their lives and in society as a whole.	

INTRODUCTION TO CHEMISTRY AND PHYSICS CP (441) Prerequisite: Successful completion of Biology.	6 Credits Full Year Grades 10-12
The Introduction to Chemistry and Physics course has been designed to develop an understanding of the relationship between matter and energy. This course is not intended to include all of the concepts taught in full-year chemistry and physics courses, but provides a solid foundation in the major topic standards taught in both. Goals of this course include assisting students to investigate the relationships and patterns among events and processes in the physical world. Chemistry topics include: techniques of measurement, the structure of the atom, isotopes, ions, bonding, classification of matter, the periodic table, properties of metals and nonmetals, and formula writing. The physics topics include: speed, velocity, acceleration, force and Newton's Laws of Motion, work and power, energy and electricity. Students having taken a full-year course in either Chemistry or Physics <i>are not eligible</i> to register for this course.	

CHEMISTRY CP (432) Prerequisite: Successful completion of Biology, Algebra 1.	6 Credits Full Year Grades 10-12
Chemistry CP is a science course designed to provide motivated students with an understanding of the important role chemistry plays in their lives. It will prepare them to enter a first-year college chemistry course with confidence. This course challenges students to apply their understanding of chemistry to everyday situations. The curriculum includes topics such as energy, structure and interactions of matter, nuclear processes, chemical reactions, stoichiometry, thermochemistry, states of matter, solutions, and acids and bases. It will address the needs of all learners through an interesting, problem-based approach to learning about the substances that make up our world. The laboratory portion of Chemistry CP is designed to give students hands-on experiences to reinforce concepts introduced in class. Mathematical skills required for this class include an understanding of ratios, percent and solving problems by substitution.	

CHEMISTRY HONORS (421) Prerequisite: Successful completion of Biology, Algebra 1.	6 Credits Full Year Grade 10-12
Completion of a summer assignment is required for this course. Chemistry Honors is designed to provide the highly motivated, college-bound student with an understanding of inorganic chemistry. Topics include: properties of matter and change; atomic theory, electron structure and periodicity; chemical bonding and reactions; stoichiometry; states of matter; solutions; thermochemistry; rates and equilibrium; acids, bases and salts; and redox reactions. This course moves at a faster pace than Chemistry CP (432) and covers a greater depth of information, requiring students to have excellent work habits and independent study skills. While a minimum grade of "B" or higher in 8th grade Algebra 1 or Algebra 1 Honors is a good predictor for success in this course, it is strongly recommended that students are taking Algebra 2 as a corequisite. This challenging course is highly recommended for those students interested in Advanced Placement Chemistry.	

GENERAL ENVIRONMENTAL SCIENCE (471) Prerequisite: This course is assigned at the recommendation of the Child Study Team and is a Resource Center Level course.	6 Credits Full Year Grades 10-12
General Environmental Science is a resource center replacement course. This course fulfills one year of the science requirement for high school graduation. General Environmental Science parallels the regular education Environmental Science course as students study the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world, to identify and analyze environmental problems both natural and human-made, to evaluate the relative risks associated with these problems, and to examine alternative solutions for resolving and/or preventing them. The curriculum includes topics such as: the scientific method, introduction to earth processes, ecology, populations, land, air and water quality and pollution, climate change, biodiversity and endangered species, mineral and energy resources, our health and our future, and legal aspects of conservation. The goals and objectives identified in each student's IEP will be addressed throughout this course.	

ENVIRONMENTAL SCIENCE CP (412) Prerequisite: Successful completion of Biology.	6 Credits Full Year Grades 10-12
Environmental Science CP is designed to provide students with the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world, to identify and analyze environmental problems both natural and human-made, to evaluate the relative risks associated with these problems, and to examine alternative solutions for resolving and/or preventing them. The curriculum includes topics such as an introduction to earth processes, ecology, populations, land, air and water quality and pollution, climate change, biodiversity and endangered species, mineral and energy resources, soil and agriculture, our health and our future, and environmental regulations. This curriculum will address the needs of all learners through an interesting, problem-based approach to learning about human impact on the environment.	

ENVIRONMENTAL SCIENCE HONORS (411) Prerequisite: Successful completion of Biology.	6 Credits Full Year Grades 10-12
Completion of a summer assignment is required for this course. Environmental Science Honors is designed to provide the highly motivated student with a thorough knowledge of environmental issues. Students will analyze environmental problems, evaluate the ecological, economic, and environmental impacts of these problems, and examine solutions for reducing these impacts through class discussions, and both field and lab work. Units examine how earth systems support life, how humans became the dominant species, how human population growth impacts earth systems, and how we can be more sustainable given global change. Specific topics include earth science systems, ecology and biodiversity, human population growth, land use, food and agricultural practices, energy resources, air and water quality, and climate change. In addition, important environmental legislation, environmental disasters, and environmental justice will be woven throughout the course along with science practices like data analysis and writing claims with evidence and reasoning. This course covers a greater depth of information than Environmental Science CP (412) and students will be required to demonstrate knowledge and to apply that knowledge on both formative and summative assessments. This means they will be held to a higher standard in terms of course rigor and expectations as compared to Environmental Science CP. Students should be organized and able to manage their time as they will have to juggle assignments from time to time with overlapping due dates. A minimum grade of "B" or higher in Biology CP and Chemistry CP or a grade of "C" in Biology Honors and Chemistry Honors are good predictors for success in this course as	

students will be expected to incorporate their knowledge of both disciplines with the analysis of various environmental issues.

AP ENVIRONMENTAL SCIENCE (454) Prerequisite: Successful completion of Biology, Algebra 1 and an AP Science application is required.	6 Credits Full Year Grades 10-12
Completion of a summer assignment is required for this course. AP Environmental Science is an advanced level science course, incorporating field and lab work, that is designed to provide a student with a thorough knowledge of environmental issues. In this course, students will analyze environmental problems, evaluate the ecological, economic, and environmental impacts of these problems, and propose solutions for reducing these impacts. Units examine how earth systems support life, how humans became the dominant species, how human population growth impacts earth systems, and how we can be more sustainable given global change. Specific topics include earth systems, ecology and biodiversity, human population growth, land use, food and agricultural practices, energy resources, air and water quality, and climate change. All AP units of study include math-based logic calculations, data analysis, and critical reading, related to environmental issues, as well as the examination of important environmental legislation, environmental disasters, and environmental justice issues that disproportionately impact vulnerable populations. Students entering this course should have strong organization and time management skills and have received a minimum grade of “B” or higher in Biology CP and Algebra 1 to be most successful. It is expected that all AP Environmental Science students take the AP Environmental Science Exam in May.	

NATURAL RESOURCES AND ECOLOGY (445) (formerly known as Sustainability Science 1) Prerequisite: Successful completion of Biology	6 Credits Full Year Grades 10-12
Natural Resources and Ecology (NRE) is a full year lab course devoted to applying science and engineering practices to managing our natural resources from an ecological perspective. NRE is one of nine courses offered by the Curriculum for Agricultural Science Education (CASE), a national program devoted to providing career-based curricula in agricultural science education, especially in natural resources management. Successful completion of an end-of-year exam can earn 3 college credits from Rutgers University as a substitute for a Natural Resources Course offered through the School of Environmental and Biological Sciences (SEBS). This course represents the first course in the Sustainability Pathway at LHS, and an alternative to Environmental Science CP that will fulfill necessary NJ state science standards.	

PHYSICS CP (442) Prerequisite: Successful completion of Biology, Algebra 1, Geometry.	6 Credits Full Year Grades 10-12
This lab-based course has been structured to provide students with the opportunity to explore physics phenomena relevant to their lives. A strong conceptual understanding of the world will be developed through varied modeling and inquiry strategies that include mathematical models. Students explore topics such as motion, forces, momentum, work & energy, electricity, magnetism, mechanical waves, and optics by participating in observational experiments that are based on the science and engineering	

practices based on the NGSS. Throughout the year, students will also partake in engineering design projects to showcase their understanding of concepts. A comfortable understanding of Algebra I is strongly recommended for this course. Modeling and inquiry strategies aid students in developing strong conceptual understanding, a basis for mathematical models and application of concepts.

PLEASE NOTE: Students taking Physics over the summer for advancement must declare which future Physics elective(s) they are interested in taking. For students interested in either of the AP Physics 1 or AP Physics 2 electives, the CP Physics midterm and final exam would be given. For students pursuing either of the AP Physics C options, the AP Physics 1 midterm and final exams would be given. Students interested in this option should obtain an AP Physics 1 prep book and use it to guide their study.

AP PHYSICS 1 (457)

Prerequisite: Successful completion of Biology, Algebra 1 and Geometry and an AP Science application is required.

Prerequisite/Corequisite: Algebra 2.

**6 Credits
Full Year
Grades 10-12**

Completion of a summer assignment is required for this course.

This course follows the curriculum set forth by the College Board and is equivalent to a first semester algebra-based Physics course. Students will require a strong algebraic background and knowledge of right triangle trigonometry to be successful in this course. A solid background (minimum grade of "B") in Algebra 1 Honors, Geometry Honors, and Algebra 2 Honors are good predictors for success in the course. Topics of study include kinematics, Newton's Laws of motion, uniform circular motion, gravitation, conservation laws including energy and momentum, rotation, and oscillations.

There will be a focus on inquiry-based laboratory activities which challenge students to design and carry out experiments targeting certain learning objectives. Students will learn to coherently and logically show their problem solving process starting with fundamental physics principles. They will also construct explanations of various phenomena based on evidence. After the AP exam in May, students will collaborate on projects and/or various topics in physics. Students intending to take AP Physics 2, AP Physics C: Mechanics, and/or AP Physics C: E&M must have first taken AP Physics 1. It is expected that all students take the AP Physics 1 exam in May.

Please note that students who choose to drop AP Physics 1 will be moved into CP Physics (unless the student chooses to drop Physics entirely). It is important to note that AP Physics 1 and CP Physics do not follow the same scope and sequence. CP Physics provides a survey of Physics concepts while AP Physics 1 focuses on fewer concepts but in more detail. Students who drop into CP Physics may be required to complete an abbreviated make-up assignment in order to attain the necessary concepts students will need for success in future units.

PLEASE NOTE: Students taking Physics over the summer for advancement must declare which future Physics elective(s) they are interested in taking. For students interested in either of the AP Physics 1 or AP Physics 2 electives, the CP Physics midterm and final exam would be given. For students pursuing either of the AP Physics C options, the AP Physics 1 midterm and final exams would be given. Students interested in this option should obtain an AP Physics 1 prep book and use it to guide their study.

AP BIOLOGY (450) Prerequisite: Successful completion of Biology and an AP Science application is required. Prerequisite/Corequisite: Chemistry or Chemistry Honors.	6 Credits Full Year Grades 10-12
Completion of a summer assignment is required for this course. Advanced Placement Biology is designed to be the equivalent of a college introductory biology course, usually taken by biology majors during their first year. This course is designed to provide students with the conceptual framework, factual knowledge, and analytical skills necessary to deal critically with the rapidly changing science of biology. The College Board based curriculum includes topics such as general chemistry, biochemistry, molecular genetics, origin of life, evolution, animal behavior, cellular biology, cell transport, microbiology, nervous, immune and endocrine systems, cell energetics and cellular respiration, photosynthesis, cellular reproduction, Mendelian genetics, population genetics, ecology, and genetic engineering. A minimum grade of "B" or higher in Biology Honors is a good predictor for success in this course. Though a student could be successful in AP Biology while concurrently taking Chemistry, it is highly recommended that students have a first-year Chemistry course prior to registering for AP Biology. It is expected that all AP Biology students take the AP Biology Exam in May.	

BIOTECHNOLOGY 1 (447) Prerequisite: Successful completion of Biology, Chemistry.	6 Credits Full Year Grades 11-12
Biotechnology is one of the fastest growing industries in the nation. The applications of biotechnology can be seen in various industries, from agriculture and environmental protection, to forensics, engineering, medicine, and business lifecycle management. This course is designed with a lab-focused lens and offers students an introduction to many of the techniques which are used in scientific research labs. The curriculum includes microbiology, microscopy, pipetting, electrophoresis, and other research assays with a strong focus on scientific communication and literacy. The lab skills learned in this course provide a strong foundation to those looking to continue on to science-focused studies in college. This course is required for all students participating in the Biotechnology Pathway at Livingston High School; however, all students can take this introductory course as an elective. A minimum grade of "C" in Biology and Chemistry, as well as a strong work ethic are good predictors for success in this course. Students can elect to take the NOCTI (National Occupational Competency Testing Institute) examination for this course. If they pass the NOCTI exam, they will then receive industry accreditation and documentation that will benefit them when they try to secure positions in laboratory or pharmacological related careers.	

BIOTECHNOLOGY 2 (449) Prerequisite: Successful completion of Biotechnology 1.	6 Credits Full Year Grade 12
This course is designed to build upon the strong laboratory foundation fostered in Biotechnology 1 and provide insight to the diversified applications of the biotechnology industry. Students will complete upper level labs associated with agriculture and pharmacological development, as well as complete independent research on a topic of their choice. Students will foster collaboration with industry and academia. Students will also develop their ability to communicate their findings through science	

research paper development, presentations, and poster development sessions. Challenges for science fair and modeling competitions will also be explored.

This course is designed to be the capstone experience within the Biotechnology Pathway. A minimum grade of "C" in Biotechnology 1 and a passing score on the NOCTI Biotechnology assessment are good predictors for success in this course.

AP CHEMISTRY (451)

Prerequisite: Successful completion of Biology, Chemistry, Algebra 1 and an AP Science application is required.

Prerequisite/Corequisite: Algebra 2.

6 Credits
Full Year
Grades 11-12

Completion of a summer assignment is required for this course.

Advanced Placement Chemistry is designed to be the equivalent of a college introductory chemistry course. Students in this course attain a depth of understanding of fundamentals and competence in dealing with chemical problems; chemical periodicity viewed by quantum mechanics; stoichiometric calculations involved with chemical reactions; energy involved in chemical reactions; behavior of ideal and real gasses based on the Kinetic Molecular Theory; physical and chemical properties of liquids and solids determined by molecular motion and intermolecular bonding; chemical kinetics; equilibrium; thermodynamics; acids, bases, and salts, including buffer solutions; and electrochemistry. A minimum grade of "B" or higher in Chemistry Honors is a good predictor for success in this course. It is expected that all students take the AP Chemistry exam in May.

DYNAMICS OF HEALTHCARE IN SOCIETY (448)

Prerequisite: Successful completion of Biology and Algebra 1 with minimum grade of C or higher in each course (Rutgers Dual Enrollment Requirement)

Pre/Corequisite: Chemistry Honors or Chemistry CP

6 Credits
Full Year
Grades 10-12

Dynamics of the Healthcare in Society provides an orientation to health care services and their delivery. It presents an interdisciplinary perspective, focusing on process skills such as critical thinking, ethical reasoning, effective communication and ways to continue independent learning throughout life. Students will learn how all health care providers acquire professional competency in dealing with the issues and problems they face when caring for the hospitalized patient as well as the role they play as informed consumers. Students will familiarize themselves with the multitude of careers available in the US healthcare system along with the educational and credentialing requirements of select professions. Ethics, legal issues, and professionalism will be stressed through case studies of patient privacy and various other ethical dilemmas faced by medical professionals. Public Health responsibilities and Patient Advocacy roles will be discussed along with the Basic Anatomy and Physiology needed to provide basic patient care (Vital Signs and Suturing). Other important topics include Infection Control and Safety Measures in a healthcare setting along with Health Care Economics.

This course is required for all students participating in the dual credit Rutgers School of Health Professions Health Science Careers program (RHSP) pathway at Livingston High School.

Students can elect to take the Rutgers examination for this course provided that they maintain a 70% or better cumulative average at the exam registration cutoff. If they pass the Rutgers exam with a 70% or better, they are eligible to receive three Rutgers credits. *This is contingent on them taking and passing one additional Rutgers Health Science Professions course, which would be Anatomy and Physiology 1.* The Rutgers School of Health and Professions exams grade will be the grade listed on the Rutgers SHP transcript.

Note: This course is available to all students as an elective; however, it is a requirement for those students looking to complete the Health Sciences Pathway.

FORENSIC SCIENCE (446)**Prerequisite: Successful completion of Biology, Algebra 1.****6 Credits
Full Year
Grades 10-12**

Forensic Science is designed for the well-motivated student with an interest in science as it applies to the legal system. Students will integrate knowledge from the fields of physical science, biology and mathematics to analyze crime scene evidence. Topics include analysis of DNA, fingerprints, hairs, fibers, entomology, and blood spatter. Class time will be devoted to mastering techniques in evidence evaluation. Students will be required to identify and document evidence in mock crime scenes, analyze evidence and communicate analysis in a written format. The culminating final project is a choice assignment with many different possible assignments to choose from. A minimum grade of "C" in Biology CP and a strong work ethic are good predictors for success in this course.

THE HUMAN BODY (435)**Prerequisite: Successful completion of Biology.****6 Credits
Full Year
Grades 10-12**

The Human Body has been designed to present an anatomical and physiological study of the human systems with an emphasis on homeostasis and the disruption of homeostasis by disease. Students will investigate how the structures of individual tissues come together to make a fully functional organ system. Students will be exposed and get an introduction to the various different body systems and will deepen their understanding of them through a year-long series of dissections; starting first at the organ level, then culminating in a full organism dissection where they can investigate the interconnectivity of the body systems. The course is divided into three major themes; protection, movement and support, and transport. This course will also look into cancer and various other diseases that can come about when systems become disrupted. This will be a unifying concept throughout the entire course, enabling students to have a grasp of different diseases they might interact with throughout their lives. A minimum grade of "C" in Biology CP as well as a strong work ethic, are good predictors for success in this course. This course is not connected to the Health Science Pathway or to Rutgers dual enrollment credit.

ANATOMY AND PHYSIOLOGY 1 (426)**Prerequisite: Successful completion of Biology, Chemistry and Dynamics of Health Care in Society (including RHSP examination of 70% or better).****6 Credits
Full Year
Grades 11-12**

The Anatomy and Physiology I course is the first course in a two-year sequence of the study of the structure and function of the human body. This course follows a sequential development of the major body systems in an organized and structured curriculum. The course is designed to give the students a selective overview of human anatomical structure and an analysis of human physiological principles. Labs will include slide work, dissection of various animals and studies of the human skeleton and muscular system. The course will also use computer simulated dissection, including dissection, exercise physiology and biochemical principles. In this course, the following topics will be discussed: characteristics of life and levels of organization, biochemistry, cell structure and function, the integumentary system, the skeletal system, the muscular system, the nervous system, and special senses.

This course is offered as a dual credit option through the Rutgers School of Health Science Professionals (4 credits). The minimum level of satisfactory performance in this course is a 'C-' or better. To receive a 'C-' (70% average) or better, students must first complete ALL course requirements specified above, including meeting the minimum attendance expectation. Students who have a 70% cumulative average or better at the exam registration cutoff will be eligible to take the Rutgers School of Health Professions, Health Science Careers standardized exam to determine college credit. For Anatomy and Physiology 1, the Rutgers School of Health Professions exam grade will be the grade listed on Rutgers SHP transcript. All students must attain a 70% or better on the Rutgers exam to earn college credits.

In addition, the first half of Medical Terminology will be infused into this course. Students taking Anatomy and Physiology 2 (RHSP) the following year will have the opportunity to sit for both the Anatomy and Physiology 2 (RHSP) and the Medical Terminology (RHSP) exams.

ANATOMY AND PHYSIOLOGY 2 (427)

Prerequisite: Successful completion of Biology, Chemistry, Dynamics of the Health Care in Society and Anatomy & Physiology 1 (including RHSP examinations of 70% or better for both).

**6 Credits
Full Year
Grades 11-12**

The Anatomy and Physiology 2 course is the second course in a two-year sequence of the study of the structure and function of the human body. This course follows a sequential development of the major body systems in an organized and structured curriculum. The course is designed to give the students a selective overview of human anatomical structure and an analysis of human physiological principles. Labs will include dissection of various animals and specific organs and various activities to study blood, digestive processes and excretory functions. The course will also use computer simulated dissection. In this course, the following topics will be discussed: the endocrine system, the cardiovascular system, including heart structure and function, blood, the lymphatic system and the immune system, the excretory system, the male and female reproductive systems and pregnancy.

This course is offered as a dual credit option through the Rutgers School of Health Science Professionals (4 credits). The minimum level of satisfactory performance in this course is a 'C-' or better. To receive a 'C-' (70 average) or better, students must first complete ALL course requirements specified above, including meeting the minimum attendance expectation. Students who have a 70% cumulative average or better at the exam registration cutoff will be eligible to take the Rutgers School of Health Professions, Health Science Careers standardized exam to determine college credit. For Anatomy and Physiology 2, the Rutgers School of Health Professions exam grade will be the grade listed on Rutgers SHP transcript. All students must attain a 70% or better on the Rutgers exam to earn college credits.

In addition, the second half of Medical Terminology will be infused into this course. Students taking Anatomy and Physiology 2 will have the opportunity to sit for both the Anatomy and Physiology 2 and the Medical Terminology exams.

MEDICAL TERMINOLOGY

Prerequisite: Successful completion of Anatomy & Physiology 1 (including RHSP examination of 'C' or better).
Pre/Corequisite: Anatomy and Physiology 2 - RHSP

**0 Credits
Full Year
Grades 11-12**

Medical Terminology is the study of words that pertain to body systems, anatomy, physiology, medical processes and procedures and a variety of diseases. It provides specialized language for the health care team, enabling health care workers to communicate in an accurate, articulate and concise manner. This course is designed to give the students a comprehensive knowledge of word

construction, definition and use of terms related to all areas of medical science. The course includes but is not limited to terms related to anatomy of the human body, functions of health and disease, and the use of language in processing medical/dental records and claim forms.

This course is part of the dual enrollment option through the Rutgers School of Health Science Professionals. This course is split between Anatomy and Physiology 1 CP and Anatomy and Physiology 2 CP. This will better help students contextualize the terminology they are learning by relating it to the study of the human body. While there is no separate grade for medical terminology recorded on the LHS transcript, students will be taking terminology assessments throughout both years. These grades will be logged into a separate spreadsheet to help generate a summative grade. As a 3-credit, dual credit option through the Rutgers School of Health Science Professionals, the minimum level of satisfactory performance in this course is a 70% or better. To receive a 70% average or better, students must first complete ALL course requirements specified above, including meeting the minimum attendance expectation. Students who have a 70% cumulative average or better at the exam registration cutoff will be eligible to take the Rutgers School of Health Professions, Health Science Careers standardized exam to determine college credit. For Medical Terminology, the Rutgers School of Health Professions exam grade will be the grade listed on Rutgers SHP transcript. All students must attain a 70% or better on the Rutgers exam to earn college credits.

AP PHYSICS 2 (458)

Prerequisite: Successful completion of AP Physics 1, Algebra 2 and an AP Science application is required.

Corequisite: Pre-Calculus.

**6 Credits
Full Year
Grade 11-12**

Completion of a summer assignment may be required for this course.

This course follows the curriculum set forth by the College Board and is equivalent to a second semester algebra-based Physics course. Students must have taken AP Physics 1 as a prerequisite course. Minimum grades of "B" or higher in AP Physics 1 and Algebra 2 Honors are good predictors for success in this course. Topics include fluid statics and dynamics, thermodynamics, electrostatics, electrical circuits, magnetic fields, electromagnetism, physical and geometric optics, and topics in modern physics. There will be a focus on inquiry-based laboratory activities which challenge students to design and carry out experiments targeting certain learning objectives. After the AP exam in May, students will utilize their conceptual and mathematical understanding to successfully complete engineering design challenges. It is expected that all students take the AP Physics 2 exam in May.

AP PHYSICS C Mechanics (456)

Prerequisite: Successful completion of AP Physics 1, Algebra 1, 2, Geometry and Pre-Calculus and an AP Science application is required.

Prerequisite/Corequisite: Calculus.

**6 Credits
Full Year
Grade 11-12**

Completion of a summer assignment may be required for this course.

Advanced Placement Physics C: Mechanics is designed to be the equivalent of a college level course in calculus-based physics. This course provides the same foundation available in college for students majoring in the physical sciences or engineering and is an intensive and analytical course with calculus applied whenever appropriate. AP Physics C: Mechanics provides instruction in each of the following content areas: kinematics; Newton's laws of motion; work, energy, and power; systems of particles and linear momentum; circular motion and rotation; and oscillation and gravitation. Minimum grades of "B"

or higher in Pre-Calculus Honors and AP Physics 1 are good predictors for success in this course. It is expected that all students take the AP Physics C - Mechanics exam in May.

AP PHYSICS C Electricity and Magnetism (455) Prerequisite: Successful completion of AP Physics 1, Algebra 1, 2, Geometry and Pre-Calculus and an AP Science application is required. Prerequisite/Corequisite: Calculus.	6 Credits Full Year Grade 11-12
Completion of a summer assignment may be required for this course. Advanced Placement Physics C: Electricity and Magnetism is designed to be the equivalent of a college level course in calculus-based physics. This course provides the same foundation available in college for students majoring in the physical sciences or engineering and is an intensive and analytical course with calculus applied whenever appropriate. AP Physics C: Electricity and Magnetism provides instruction in each of the following content areas: electrostatics, conductors, capacitors, and dielectrics; electric circuits; magnetic fields; and electromagnetism. Minimum grades of "B" or higher in Pre-Calculus Honors and AP Physics 1 are good predictors for success in this course. It is expected that all students take the AP Physics C – Electricity and Magnetism exam in May.	

AP SEMINAR (234) Prerequisite: AP Seminar application and teacher recommendation required. Due to limited availability, enrollment in this course is based on acceptance into the program.	5 Credits Full Year Grades 10-11
Completion of a summer assignment may be required for this course. Please check with the instructor for further details. Students must apply and be selected for this two-year AP Capstone program. Students will develop their analytical skills by exploring appropriate themes and topics selected by the teachers and the students. Students will learn to synthesize information from multiple sources, develop their own perspectives in research-based essays, and design oral and visual representations. Students will be expected to complete an individual paper, presentation, and end-of-course exam as well as a team research project. These benchmark assignments will be submitted to the College Board and contribute to the final AP score. The second course needed to complete the AP Capstone program, <i>AP Research</i> , will be offered the following school year.	

AP RESEARCH (235) Prerequisite: Successful completion of AP Seminar.	5 Credits Full Year Grade 11-12
Completion of a summer assignment may be required for this course. Please check with the instructor for further details. This full-year elective course will be the second class needed to complete the two-year AP Capstone program. This course will allow students to deeply explore an academic topic, problem, or issue of their own choice and interest. Through this investigation, students will cultivate the skills and discipline necessary to conduct independent research. Students will learn to design an effective and ethical plan of investigation, which utilizes various academic research methods. The students will demonstrate their understanding by constructing a 5,000-word academic thesis paper as well as present and perform an oral defense of their research methodology.	

NATURAL RESOURCES AND ECOLOGY (445) (formerly known as Sustainability Science 1) Prerequisite: Successful completion of Biology	6 Credits Full Year Grades 10-12
Natural Resources and Ecology (NRE) is a full year lab course devoted to applying science and engineering practices to managing our natural resources from an ecological perspective. NRE is one of nine courses offered by the Curriculum for Agricultural Science Education (CASE), a national program devoted to providing career-based curricula in agricultural science education, especially in natural resources management. Successful completion of an end-of-year exam can earn 3 college credits from Rutgers University as a substitute for a Natural Resources Course offered through the School of Environmental and Biological Sciences (SEBS). This course represents the first course in the Sustainability Pathway at LHS, and an alternative to Environmental Science CP that will fulfill necessary NJ state science standards.	

SUSTAINABILITY SCIENCE 2 (429) Prerequisite: Successful completion of Biology, Environmental Science and Sustainability Science 1	6 Credits Full Year Grade 11-12
In this is the culminating course for the LHS Sustainability Pathway, students will assume the role of researcher and steward to their communities, both local and global. Designed for a student interested in pursuing a career in environmental engineering or sustainable business, this course is a hand-on, independent study with the teacher assuming the role as coach to assist in student-driven projects. Sustainability Science 2 is the second full year lab course devoted to applying science and engineering practices to confronting sustainability issues within our community, at the local, national, and global scale. Major units of study are tailored to students' individual interests. This project-based course will combine independent research, experimentation, engineering design, and community outreach opportunities with the LHS community, local businesses, and universities.	

INTRODUCTION TO RESEARCH METHODS HONORS (423) Prerequisite: Successful completion of Biology. Application and teacher recommendation required. Due to limited availability, enrollment in this course is based on program acceptance.	5 Credits Full Year Grade 10
Completion of a summer assignment is required for this course. The Science Research program at Livingston High School is a three-year sequence of courses that begins with the 10th Grade student. Students have the opportunity to perform research projects and participate in the scientific research community as part of their high school experience. They will learn time management, sophistication in dealing with professionals, and bibliographic research using online services. Students choose a topic from mathematics, physical sciences, life sciences, social sciences, or psychology and pursue this research for three years. The first year is dedicated to searching for and defining a topic of interest, learning the process of primary article dissection, basic statistics, presentation of knowledge in written and oral forms, finding a mentor, and collaborating to host the Annual Science Research Symposium.	

INTERMEDIATE RESEARCH METHODS HONORS (434) Prerequisite: Minimum grade of B in Introduction to Research Methods Honors.	5 Credits Full Year Grade 11
Completion of a summer assignment is required for this course. This is the second course in the three-year Science Research Program. After completing a summer research experience, students will continue obtaining, evaluating, and synthesizing primary sources on their topic of interest. They will engage in activities that help them to strengthen their ability to pose research questions, design experimental procedures, analyze and interpret data, construct explanations, and communicate their findings. Students will solidify a summer experience in which they will conduct authentic research on their topic, which allows them to write their culminating research paper during their senior year. Students in Intermediate Research Methods Honors will take a leadership role in developing and executing the Science Research Program's Annual Science Symposium.	

ADVANCED RESEARCH METHODS (443) Prerequisite: Minimum grade of B in Intermediate to Research Methods Honors.	5 Credits Full Year Grade 12
Completion of a summer assignment is required for this course. After conducting their authentic research projects during the summer, students in Advanced Research Methods will write their culminating research paper. This paper will include an abstract, introduction, methods section, data and analysis section, discussion section, acknowledgements, and literature cited. These research papers will be submitted to various Science Research competitions throughout the year. Students will also develop presentations on their research, which will include elevator speeches and a 10-12 minute PowerPoint presentation. As seniors, these students will be the keynote speakers at the Science Research Annual Science Symposium. Because of the level of advanced research conducted, this course will receive AP weighting when grades are calculated.	

ASTRONOMY (433) Prerequisite: Successful completion of Biology.	2.5 Credits Semester Grades 10-12
Science begins with observation. Ancient societies used the motions of the Sun, Moon, and stars to establish their cultures and sustain their people. The field of astronomy has changed dramatically over the last millennia, and with every new discovery, our understanding of the Universe changes as well. This semester course is designed to provide students with an exploratory experience in astronomy topics including: gravity, orbital motion, constellations, moon phases, telescopes, the solar system, stellar evolution, galaxies, the big bang, and the possibility of life outside our solar system. Hands-on lab activities as well as use of the STARLAB simulator are methods to explore these topics in greater depth.	

MEDICAL MICROBES (437) Prerequisite: Successful completion of Biology.	2.5 Credits Semester Grades 10-12
Despite enormous advances in treatment and prevention made during the 20 th Century, infectious diseases remain a leading cause of death worldwide. Today, diseases once thought eradicated are re-emerging, others historically responsive to treatment are becoming increasingly drug-resistant, and emerging pathogens are posing new threats to human health. The goal of this semester course is to	

give students a basic understanding of the causes, pathology, and treatments of human infectious diseases, if they are known through the eyes of Public Health. Though not a lab class, students will have the opportunity to explore plating, isolating and identifying bacteria, as well as simulations of viral outbreaks that mimic our recent pandemic. We will look at the rise of HIV/AIDS from both a historical perspective and early 'gum-shoe' epidemiology, and compare it to the rise of SARS Cov-2 (Covid 19). Students will also explore how socioeconomic conditions and human decisions affect the spread of disease.

NATURAL DISASTERS (438)

Prerequisite: Successful completion of Biology.

2.5 Credits
Semester
Grades 10-12

This semester course will use historical case studies to examine the causes and impacts of natural disasters such as tsunamis, earthquakes, volcanoes, and hurricanes. To accomplish this, students will learn how Earth systems and processes work, how humans interact with them, with sometimes disastrous results, and how disasters can be mitigated. Socioeconomic issues such as economic costs, costs to human and ecosystem health, and aid relief and recovery in developed versus undeveloped nations will be incorporated into class discussions.

ORGANIC CHEMISTRY (436)

Prerequisite: Successful completion of Biology and Chemistry.

2.5 Credits
Semester
Grades 11-12

Organic Chemistry is a semester course designed to provide a general background in organic chemistry for students interested in any medical field or a specific career in science. Organic Chemistry deals specifically with the structures, synthesis, and reactions of carbon-containing compounds. This organic chemistry course will help students to understand the reactions, industrial uses, biological significance, and environmental concerns associated with alkanes, alkenes, alkynes, alcohols, ethers, aldehydes, ketones, organic acids, and amines as well as provide students with an introduction to polymer chemistry. Topics have been chosen by carefully examining prerequisite knowledge from biology and chemistry classes, looking at background information needed for college, medical school and other professional fields, and by examining the relevancy of the material in terms of students' lives. Labs are scheduled within regular class periods and are all safe "hands-on" activities. A minimum grade of "B" in Chemistry CP or a grade of "C" in Chemistry Honors would be a good predictor for success in this course.