SCIENCE

4 Credits Required

Required Courses: Physics, Chemistry, Biology, and choice of Elective (Or IB, AP or Dual Credit course equivalents)

Course Name	9	10	11	12	Credit	Prerequisite[#]
Pre-IB Physics	X				1.0	Acceptance into the PMSA Pre-IB Program
Pre-IB Chemistry		X			1.0	PMSA Pre-IB Physics
AP Biology*			X	X	1.0	Chemistry, Department Recommendation; OR Biology, Departmental Recommendation
Biology			X		1.0	Chemistry
IB Physics			X		1.0	Acceptance into the IB Diploma Programme/Permission of Instructor (Certificate Candidates)
IB Chemistry			X		1.0	Acceptance into the IB Diploma Programme/Permission of Instructor (Certificate Candidates)
IB Biology - DP Year 1			X		1.0	Acceptance into the IB Diploma Programme/Permission of Instructor (Certificate Candidates)
IB Biology - DP Year 2				X	1.0	IB Biology - DP Year 1
IB Physics - DP Year 1			X		1.0	Acceptance into the IB Diploma Programme/Permission of Instructor (Certificate Candidates)
IB Physics - DP Year 2				X	1.0	IB Physics - DP Year 1
Human Genetics				X	1.0	Biology
Anatomy and Physiology				X	1.0	Biology
AP Physics*				X	1.0	Senior Level Standing and Department Recommendation
AP Chemistry*				X	1.0	Biology, and Department Recommendation
Forensics				X	1.0	Biology

*All Dual Credit courses require students to meet qualification requirements established by Triton College.

[#]Prerequisite courses must be completed with a passing grade.

Course Descriptions (alphabetical order)

Anatomy and Physiology

Grade: 12

Length: 2 semesters

State Course Code: 03053A000

This course is a comprehensive college preparatory elective science course. Topics will include the organization of the human body, basic biochemistry, cells and tissues, integumentary system, skeletal system, muscular system, nervous system, special senses, endocrine system, cardiovascular system, lymphatic and immune system, respiratory system, digestive system, urinary system, reproductive system, development and inheritance. Laboratory work includes dissection of preserved specimens, microscopic study, physiologic experiments and computer simulations.

AP Biology
Grade: 11, 12
Length: 2 semesters
State Course Code: 03056A000
AP® Biology includes topics that are regularly covered in a college introductory biology course and differs significantly from the standards-based, high school biology course with respect to the kind of textbook used, the range and depth of topics covered, the kind of laboratory work performed by students, and the time and effort required of the students. The textbook used by AP® Biology is also used by college biology majors and the kinds of labs done by AP® students are equivalent to those done by college students. AP® Biology is a course that aims to provide students with the conceptual framework, factual knowledge, and analytical skills necessary to deal critically with the rapidly changing science of biology. Triton College dual credit may be available. Students in this course are required to take the AP® Exam. Fee: Cost of the AP® Exam fee per the College Board rate. Reduced fee waivers may apply.

AP Chemistry
Grade: 12
Length: 2 semesters
State Course Code: 03101A000
This course is a science elective that gives students an opportunity to earn credit for one year of general chemistry based on performance on the College Board Advanced Placement (AP®) Exam in chemistry. This rigorous mathematics-based course will further develop student's ability to solve chemistry problems through laboratory and classroom experiences. Topics covered include matter and measurements, atomic structure, basic concepts of quantum theory, bonding, periodic trends, stoichiometry of reactions, thermochemistry, kinetic molecular theory, concepts of the liquid and solid states, solutions, redox reactions, acid-base theories, kinetics, free energy, entropy and equilibria. Triton College dual credit may be available. Students in this course are required to take the AP® Exam. Fee: Cost of the AP® Exam fee per the College Board rate. Reduced fee waivers may apply.

AP Physics
Grade: 12
Length: 2 semesters
State Course Code: 03163A000
Designed by the College Board, AP Physics 1 is an algebra-based, introductory college-level physics course that explores topics such as Newtonian mechanics (including rotational motion); work, energy and power; mechanical waves and sound; and introductory, simple circuits. Through inquiry-based learning, students will develop scientific critical thinking and reasoning skills. Triton College dual credit may be available. Students in this course are required to take the AP® Exam. Fee: Cost of the AP® Exam fee per the College Board rate. Reduced fee waivers may apply.

Biology
Grade: 11
Length: 2 semesters
State Course Code: 03051A000
This course deals with the study of living things and attempts to develop understandings of basic biological principles. Emphasis is placed upon the chemical and physical basis of life, the continuity of life, the fundamental life processes, evolution of life, and the interdependence of living things and the environment. The program will be heavily oriented toward laboratory investigation and critical thinking skills. Students should have above average abilities in reading, science, and critical thinking skills to be enrolled in this course.

Forensic Science
Grade: 12
Length: 2 semesters
State Course Code: 03202A000
In Forensic Science we present the philosophical, rational, and practical framework that supports a case investigation. We outline the unifying principles of forensic science, discuss what a forensic scientist might consider during an investigation. We also discuss the experimental methods and some of the ways in which a forensic analysis can be confounded. This class is not an overview of the disciplines that comprise the Forensic Science, but rather the umbrella under which the practical work resides. Students will work through interactive exercises and discuss various scenarios with the instructors and their fellow classmates in a discussion forum. The explanation and clarification of assumptions and inferences will be emphasized. At the end of the class, students will take a final examination in which they will be asked to demonstrate their knowledge of specific information that has been presented and also to extend that knowledge in considering questions about specific cases.

Human Genetics
Grade: 12
Length: 2 semesters
State Course Code: 03059A000
This course introduces basic human genetic principles and contemporary issues in biotechnology. Addresses the ethical, political and social implications of biological advances in the area of genetics. Topics include genetic counseling, gene therapy, stem cell research, cloning, forensics, paternity testing, genetic disorders and cancer.

IB Biology - DP Year 1
Grade: 11
Length: 2 semesters
State Course Code: 03057A000
Students will study the living world from the molecular level through the ecosystem level and investigate the way living systems function. Through the study of sciences, students will become aware of how scientists work and communicate with each other. Students will approach the scientific method in a practical manner although possibly in different forms. Through the overarching theme of the "Nature of Science" this knowledge and skills will be put into the context of the way science and scientists work in the 21st Century and the ethical debates and limitations of creative scientific endeavor. In this hands-on course, students will design investigations, collect data, develop manipulative skills, analyze results, collaborate with peers and evaluate and communicate their findings. Students will undertake a Group 4 Project (Students will be given a variety of topics to choose from and they will analyze a topic or problem, which can be investigated in each of the science disciplines). Students will develop the skills to work both independently and cooperatively. Topics include: Cell Biology; Molecular Biology; Genetics, Biotechnology and Bioinformatics.

IB Biology - DP Year 2
Grade: 12
Length: 2 semesters
State Course Code: 03057A000
Students will continue their study of living systems through the scientific method (following the same approach and philosophy as DP Year 1). Topics include: Ecology; Evolution and Biodiversity; Human Physiology; Plant Biology. (Additionally, students are required to take the IB examinations in May, which include short response and extended response questions.)

IB Chemistry
Grade: 11
Length: 2 semesters
State Course Code: 03107A000
Students will study the chemical principles which underpin both the physical environment in which we live and all biological systems. Through the study of sciences, students will become aware of how scientists work and communicate with each other. Students will approach the scientific method in a practical manner although possibly in different forms. Through the overarching theme of the "Nature of Science" this knowledge and skills will be put into the context of the way science and scientists work in the 21st Century and the ethical debates and limitations of creative scientific endeavor. Core topics include the following: stoichiometric relationships; periodicity; chemical bonding and structure; energetics/thermochemistry; chemical kinetics; equilibrium; acids and bases; redox processes; organic chemistry; measurement and data processing. Options for study include materials, biochemistry, energy, and medicinal chemistry. Students will undertake an Individual Investigation (possible tasks include laboratory investigation, use of spreadsheet for analysis and modeling, graphic analysis of data, hybridization of spreadsheet/database with lab investigation, interactive and open-ended simulation). (Additionally, students are required to take the IB examinations in May, which include short response and extended response questions.)

IB Physics – DP Year 1
Grade: 11
Length: 2 semesters
State Course Code: 03157A000
Students will seek to explain the universe itself from the very smallest particles to vast galaxies via theoretical, experimental and technological physics. Students will make observations, use and develop models in order to try to understand observations, and subsequently use and develop theories that attempt to explain the observations. Through the study of sciences, students will become aware of how scientists work and communicate with each other. Students will approach the scientific method in a practical manner although possibly in different forms. Through the overarching theme of the "Nature of Science" this knowledge and skills will be put into the context of the way science and scientists work in the 21st Century and the ethical debates and limitations of creative scientific endeavor. Core topics include: measurements and uncertainties, mechanics, thermal physics, waves, electricity and magnetism, circular motion and gravitation, atomic/nuclear/particle physics, and energy production. Options for study include relativity, engineering physics, imaging, and astrophysics. Students will undertake an Individual Investigation (possible tasks include laboratory investigation, use of spreadsheet for analysis and modeling, graphic analysis of data, hybridization of spreadsheet/database with lab investigation, interactive and open-ended simulation).

IB Physics – DP Year 2
Grade: 11
Length: 2 semesters
State Course Code: 03157A000
Students will continue their study of the universe itself from the very smallest particles to vast galaxies via theoretical, experimental and technological physics) following the same approach and philosophy as DP Year 1). Additionally, students are required to take the IB examinations in May, which include short response and extended response questions.

Pre-IB Chemistry
Grade: 10
Length: 2 semesters
State Course Code: 03101A000
Students will use measurement and observation skills while investigating the composition of substances and the changes they undergo. This course emphasizes the strategies and techniques of scientific investigation, problem solving, and critical thinking. This is accomplished through extensive use of demonstrations, classroom discussions,

laboratory investigations, and textbook materials. Topics are covered at a faster pace with in-depth quantitative reasoning used as the focus for each topic of study. Topics include classification of matter and changes, conservation of matter and energy, gas behavior, principles of atomic theory, nuclear chemistry, periodic properties of the elements, chemical bonding, the mole and stoichiometry, chemical reactions, acids and bases, solutions and introductory thermochemistry. Independent student projects and scientific investigations are course requirements. Additionally, PMSA Pre-IB Chemistry incorporates in-depth inquiry and more opportunities for student centered activities.

Pre-IB Physics
Grade: 9
Length: 2 semesters
State Course Code: 03151A000
Physics is the study of the fundamental behavior of the physical universe on both large and small scales. This course examines topics involving motion, momentum, energy, wave, and particle behavior using principles and strategies of inquiry. Particular emphasis is placed on physics in the modern era, studying the impact of physics and technology on our society, and the application of data analysis strategies and tools to the study of real-world data. Additionally, PMSA Pre-IB Physics incorporates in-depth inquiry and more opportunities for student centered activities.