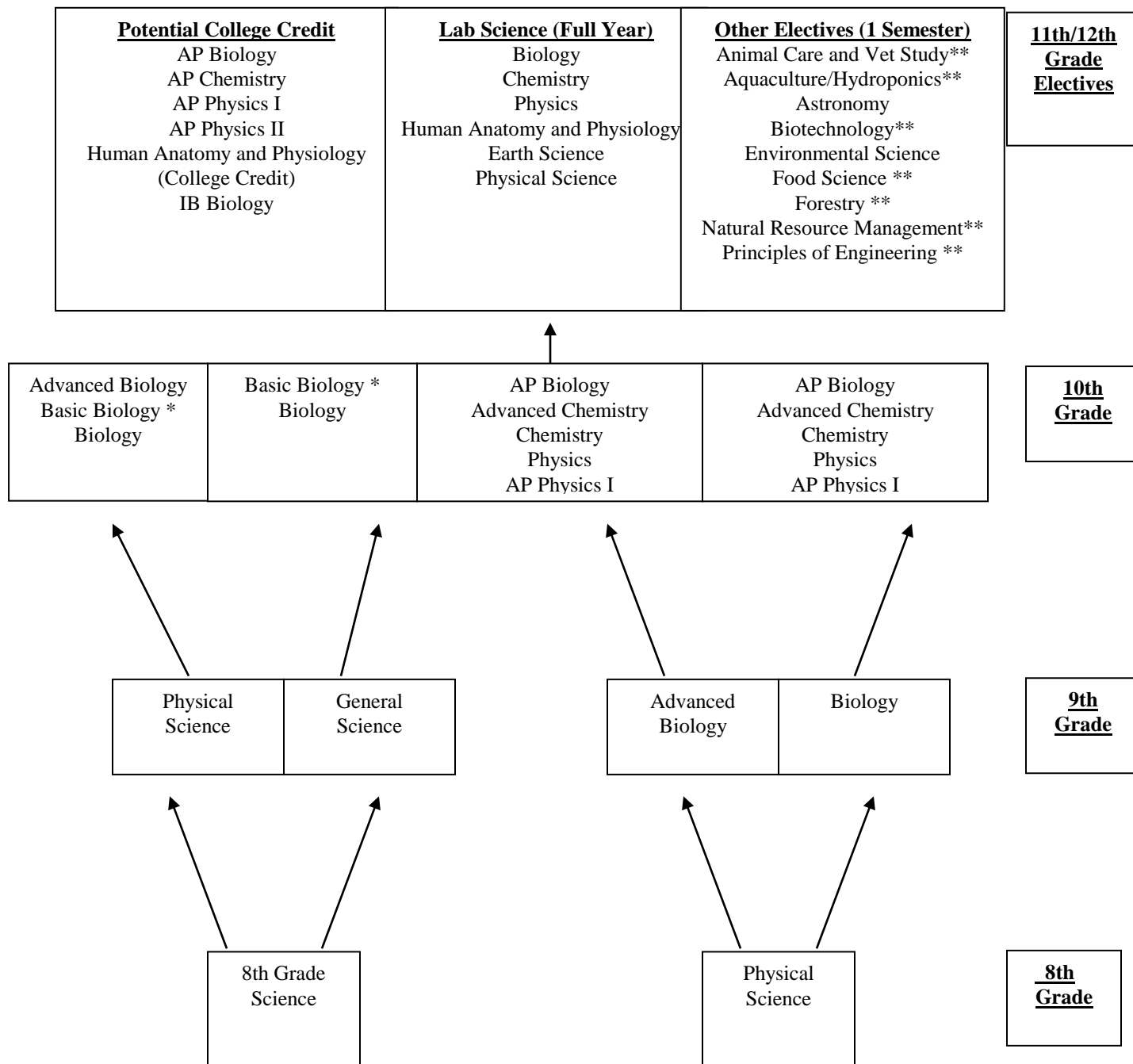


## Science Department Offerings

**Graduation requirement + 3 credits**



## SCIENCE

The Science Department offers instruction in classes which, given good study habits and a strong work ethic, will prepare students for an ever increasing technological world. It is important that students make some decisions early enough in their high school career in order to make the correct course selection. Colleges do not accept General Science, Basic Biology or other such classes as meeting requirements. Some no longer accepts Physical Science as satisfactory preparation, hence Biology and Chemistry are at least the minimum and Physics is strongly recommended. Be sure to discuss your plans with counselors and/or science staff members.

### **SUMMER ACADEMY: ACCELERATED ADVANCED CHEMISTRY**

Prerequisite: Grade of a “B” or better in Physical Science and Biology or Advanced Biology and will be taking Algebra 2 in the fall or have already successfully completed Algebra 2

This course is a laboratory science course that will cover the same topics as the full year of advanced chemistry course but at an accelerated pace. Students will be expected to attend all classes and complete a minimum of one hour of homework outside of class each day. A student can only miss a maximum of one day (four hours) from this course because one day is equivalent to more than a week of class time during the school year. This course will provide the basis for further study at the technical college and four-year college level. This course is highly recommended for students interested in taking Advanced Placement Chemistry. The purpose of this accelerated course is to move students along faster in the science sequence allowing students to progress to the highest level of science they can. The topics covered are: matter, atomic structure, periodicity, chemical bonding, chemical reactions, stoichiometry, gases, solutions, thermochemistry.

### **4011/4012 PHYSICAL SCIENCE**

Prerequisite: Concurrent enrollment in Algebra I recommended

Grade: 9

Year/ 1 credit

This is a year-long lab course that provides a solid foundation for those students taking courses in biology, chemistry and physics. Topics covered are measurement, properties of matter, energy and force, motion, natural resources, and related areas. This is a required class for those with post secondary school plans (college, technical school, etc.).

### **4021/4022 GENERAL SCIENCE**

Prerequisite: None

Grade: 9

Year/ 1 credit

This is a course designed for students who do not intend to pursue upper level science courses or who need more science skills/background before taking Physical Science. It is a course which covers a basic understanding of science concepts and skills. This non-college prep course for freshmen and will satisfy one year of the three-year science requirement for graduation.

**4041/4042 BASIC BIOLOGY**

Prerequisite: None

Grades: 10, 11

Year/ 1 credit

This is a lab-science course in which biological concepts and processes are studied. Emphasis will be on developing lab skills, communicative skills, and computational skills. The concepts that will be studied will include the scientific process, energy and life, plant and animal communities, ecology, heredity, and human biology. This is a non-college prep course.

**4051/4052 BIOLOGY**Prerequisite: "C" or better in Physical Science *OR* "A" in General Science

Grade: 9, 10

Year/ 1 credit

This course stresses science as a process of inquiring into the nature of life. Through discussion, laboratory exercises, data analysis, and written assignments, students will analyze and apply concepts from the following topics: ecological relationships, cell biology, plant and animal survey, structure-function analysis of plant and animals, genetic continuity, and human biology. Physical Science provides the needed background for Biology.

**4056/4057 ADVANCED BIOLOGY**

Prerequisite: Concurrent enrollment in Geometry or higher math. This course is intended primarily

For those students who had a "A" in Physical Science

Grades: 9, 10

Year/ 1 credit

This course is an accelerated biology course that covers more breadth and depth than the biology course. This course stresses science as a process of inquiring into the nature of life. Through discussion, laboratory exercises, and written assignments, students will analyze and apply concepts from the following topics: ecological relationships, cell biology, plant and animal survey, structure-function analysis of plant and animals, genetic continuity, and human biology. Problem analysis and experimental design are given emphasis. Students who enroll in this course should be prepared for rigorous coursework at an accelerated pace.

**4081/4082 EARTH SCIENCE**

Prerequisite: None

Grades: 11, 12

Year/ 1 credit

This year-long elective course is designed for students seeking an additional credit in science and who are interested in learning more about the Earth. This course will be lab-based and will cover topics such as Earth's composition, atmosphere, climate disruption, weather, oceanography, the dynamic nature of Earth and its continuous reshaping and resulting landforms. There may be field trip opportunities during this course.

**4061/4062    CHEMISTRY**

Prerequisite: Has successfully completed or is concurrently taking Algebra 2; “C” or better in Biology  
Grades: 10, 11, 12  
Year/ 1 credit

This course will provide the basis for further study at the technical college and four-year college level. It is the traditional high school chemistry course which is suggested for those who are planning vocations in health and other science related fields. Some of the topics covered are lab safety, significant figures, dimensional analysis, properties and changes, atomic structure and theory, the periodic table, bonding, nomenclature, the mole, reactions, and stoichiometry.

**4063/4064    ADVANCED CHEMISTRY**

Prerequisite: Physical Science and Biology or Advanced Biology with B or better, and Algebra 2 (taken or concurrent enrollment)  
Grades: 10, 11, 12  
Year/ 1 credit

This course is an accelerated chemistry course that covers more breadth, depth, and mathematical problem solving than the chemistry course. Advanced chemistry is meant as a preparatory course for AP Chemistry. Topics covered are Atomic theory, Periodicity, Chemical bonding, Chemical reactions, Stoichiometry, Gases, Solutions, Thermochemistry, Redox reactions, and Acid Base reactions. Students who enroll in this course should be prepared for rigorous coursework at an accelerated pace.

**4070        ASTRONOMY**

Prerequisite: Grade of C or better in Physical Science, Biology, and Geometry (or concurrent enrollment in Geometry)  
Grades: 11, 12  
Semester/.5 credit

This course is designed for students with a **high level** of interest in science, specifically space science, and who are seeking additional elective credits in science. The course will cover a broad view of the study of astronomy and Earth's placement in the universe. Most of the course looks at aspects of our solar system and the history of how and why humans have gained this knowledge. The content of the course is also designed to enhance critical thinking and further develop understanding of the Scientific Method. The final exam for the course is comprised of a semester project which students will present at the conclusion of the semester.

**4080        ENVIRONMENTAL SCIENCE**

Prerequisite: Grade of C or better in Physical Science and Biology  
Grades: 11, 12  
Semester/.5 credit

This course is designed for students with a *high level* of interest in science and who are seeking additional elective credits in science. It provides students with the scientific principles, concepts, and methods 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 final exam for this course is comprised of a semester project which students will present at the conclusion of the semester.

**4000/4002 HUMAN ANATOMY AND PHYSIOLOGY**

Prerequisite: One year of Biology or Advanced Biology with **at least** a “B” average. Chemistry strongly recommended.

Grades: 11, 12

Year/ 1 credit

This upper-level, 2- semester course is intended for students interested in studying how the human body works. The course uses a body systems approach emphasizing the nomenclature of structures and processes of the human body as well as interrelationships between structure and function at the gross and microscopic levels of organization of the human body. Laboratory work is also used to examine various levels of concept application. This course is designed for students interested in human biology, medicine, or healthcare-related fields.

\*Students wishing to only take 1 semester/.5 credits of the course can only take the 1st semester portion of the course during the fall semester.

**4000B/4002B HUMAN BIOLOGY (College Credit course through Bellin College)**

- **BELLIN COLLEGE credit course**
- Prerequisite: One year of Biology or Advanced Biology with at least a “B” average. Chemistry is strongly recommended.
- Grades: 11, 12
- Year/ 1 credit (8 Bellin college credits--transferable)
- \$800 tuition fee (\$100/credit)

This upper-level, 2- semester course is taught at an advanced pace and is intended for students interested in studying how the human body works. The course uses a body systems approach emphasizing the nomenclature of structures and processes of the human body as well as interrelationships between structure and function at the gross and microscopic levels of organization of the human body. Laboratory work is also used to examine various levels of concept application. This course is designed for students interested in human biology, medicine, or healthcare-related fields.

**4091/4092 PHYSICS**

Prerequisite: Concurrent enrollment in Algebra 2 or higher and a grade of “C” or better in Geometry.

Grades: 10, 11, 12

Year/ 1 credit

This course is an introduction to the fundamental principles of physics, their experimental basis, and applications. Topics covered include measurement and vector analysis, dynamics, kinematics, thermodynamics, optics and waves, and electricity. The objective of this course is to give students an understanding of the world around us and in addition, prepare students for college physics and related studies.

**4101/4102 ADVANCED PLACEMENT BIOLOGY**

Prerequisite: Must have earned a “B” or better in Biology or Advanced Biology;  
Chemistry strongly recommended.

Grades: 10, 11, 12

Year/ 1 credit

*Weighted Grading*

Advanced Placement Biology is a lab science course at the college level, which expands on many of the topics covered in Biology. Extensive work is done in the areas of molecular biology, energetic, genetics, plant and animal function/development, and population biology. Lab and process skills such as hypothesis formation, experimental design, data analysis, and the use of scientific literature are emphasized. Good communication and computational skills are essential. The course is intended for students with a high interest and ability in biology and who plan post-high school training in the life sciences.

**4111/4112 ADVANCED PLACEMENT CHEMISTRY**

Prerequisite: Algebra 2, AND Advanced Chemistry (recommended), Summer Accelerated Chemistry (recommended), or Chemistry

Grades: 10, 11, 12

Year/ 1 credit

*Weighted Grading*

This course is designed for high ability science and mathematics students who want to increase their knowledge in chemistry. As a second year chemistry class, the pace will be accelerated, utilizing more mathematical analysis, visualization, modeling, and claim/evidence/ reasoning than the traditional general chemistry course. It will more than satisfy college requirements as a laboratory science and can earn up to 10 college level credits depending on the student's AP score and college choice. Students who plan to pursue a college program in engineering, medicine, or science related areas are advised to consider AP Chemistry providing they have adequate background. The topics covered in the course are Matter and Measurement, Atomic Theory, Periodicity, Reactions, Stoichiometry, Gases, Intermolecular Forces, Chemical Bonding, Organic Chemistry, Thermochemistry, Solutions, Kinetics, Equilibrium, Acids and Bases, Thermodynamics, Electrochemistry, and Nuclear Chemistry. The laboratory experiments will be more in-depth and inquiry based than the student's first year chemistry course and specific experiments required by the College Board will be completed.

**4121/4122 ADVANCED PLACEMENT PHYSICS I**

Prerequisite: Concurrent enrollment of Algebra 2 or higher and a grade of "B" or better in Geometry.

No Prior coursework in Physics necessary.

Grade: 10, 11, 12

Year/ 1 credit

*Weighted Grading*

AP Physics 1 is an algebra-based, introductory college-level physics course that explores topics such as Newtonian mechanics (kinematics, dynamics, rotational motion, work, energy, and power), mechanical waves and sound, and simple electrical circuits. Through inquiry based learning, students will develop scientific critical thinking and reasoning skills. At the end of the 1<sup>st</sup> year, students will be prepared to take the AP Physics 1 test. As a preparatory class for Careers in engineering, medical, and other science related fields this course should be considered by those with the proper prerequisites.

**4123/4124 ADVANCED PLACEMENT PHYSICS II**

Prerequisite: Students should have had AP Physics 1 and should have taken or concurrently taking pre-calculus.

Grades: 11, 12

Year/ 1 credit

*Weighted Grading*

AP Physics is an algebra-based, introductory college-level physics course that explores topics such as fluid statics and dynamics, thermodynamics with kinetic theory, PV diagrams and probability, electrostatics, electrical circuits with capacitors, magnetic fields, electromagnetism, physical and geometric optics, and quantum/atomic/nuclear physics. Through inquiry-based learning, students will develop scientific critical thinking and reasoning skills. At the end of the 2<sup>nd</sup> year, students will be prepared to take the AP physics 2 test.

**6310      VETERINARY SCIENCE I**

Prerequisite: None

Grades: 10, 11, 12

Semester/.5 credit

Basic animal care deals with identification, selection, nutrition, breeding, genetics, and health care for animals such as dogs, cats, horses, chickens, beef, sheep, dairy cattle, and small animals. Interested in becoming a veterinarian? This class will give you basic anatomy, physiology needed to pursue any animal career. Field trips and guest speakers from various phases of the animal industry are an important part of this class. A dissection lab is included in the veterinary unit of this course. It is recommended that Small Animal and Horse Care be taken before taking this class.

**6380      NATURAL RESOURCE MANAGEMENT**

Prerequisite: None

Grades: 10, 11, 12

Semester/.5 credit

Students will learn a basic introduction of natural resources, how humans utilize them, and why they are important to protect and conserve. Concepts in the course will include waste management, wetlands, water resources, air pollution, soil conservation, energy/alternative energy sources, agriculture, and environmental issues. Students will gain a greater understanding of Earth's natural resources as well as the importance of proper management and protection. Students will also address concerns of feeding a growing world population with dwindling resources. The class will also include field trips, guest speakers, projects, and lab activities.

**6390      BIOTECHNOLOGY FOR PLANTS, ANIMALS AND THE ENVIRONMENT**

Prerequisite: None

Grade: 10, 11, 12

Semester/.5 credit

In this course, students will examine the fundamental applications of biotechnology in today's world. Course concepts will start out with an introduction of biotechnology and lead into the processes, products, and impact of biotechnology through a hands on approach. This will lead into more in depth topics including genetic engineering, animal reproduction techniques, cloning, plant tissue culture, and using microbes to clean up the environment. Students will gain a greater understanding of the challenges of feeding a growing world population and the need for biotechnology in today's society. The class will include field trips, guest speakers, and lab activities.

**6330      AQUACULTURE/HYDROPONICS**

Prerequisite: None

Grades: 10, 11, 12

Semester/.5 credit

In this course, students will learn the basics of aquaculture: raising fish, plants, and other aquatic species. Concepts covered in the course will include a basic introduction to aquaculture, history, uses, types of aquaculture facilities, types of plants and animals cultured, and careers in aquaculture. Students will be responsible for raising Yellow Perch in a small scale aquaculture lab. Students will also study Yellow Perch as part of the class. Water quality, testing, water calculations, marketing, and the business of aquaculture will be covered. Course material will also focus on hydroponic (soil-less) growing systems. Students will be responsible for the planting and care of fruits and vegetables as well. The class will also include field trips, guest speakers, projects, and lab activities.

**6370      FORESTRY**  
Prerequisite: None  
Grades: 10, 11, 12  
Semester/.5 credit

In this course, students will learn a basic introduction of forest principles and management. Concepts covered in this course will include tree structure, function, planting, care, and management of deciduous and coniferous trees. A large emphasis will be placed on tree identification, forest management techniques, fire control, chainsaw operation and safety, disease and insect control, as well as habitat improvement. Students will learn how basic forestry tools operate and have the opportunity to measure trees in various ways. The class will also include field trips, guest speakers, projects, and lab activities. The class will be involved with work at the school forest in Suamico.

**6412      FOOD SCIENCE**  
Prerequisite: Culinary Arts I and Physical Science (grade of C or higher) Recommended Culinary Arts II  
Grades: 10, 11, 12  
Semester/.5 credit

Interested in finding out how dough turns into cookies or why ice cream is so rich and creamy? Take Food Science to find out why. This course is intended to give students an understanding of the chemical and biological principals of different foods while learning about related careers in the food industry. Students will be actively engaged in various hands-on labs including chemical and biological processes of different food preparation techniques, nutritional composition and analysis of food, how foods are developed and processed as well as looking at the journey different foods take from farm to plate. This course counts as a .5 credit Science elective.

**9091A/9092A   IB BIOLOGY HL I**  
Prerequisite: Successful completion of Physical Science (B or better) and Biology. Advanced  
Biology and Chemistry are recommended but not required.  
Grade: 11 (This is a two-year course covering Junior and Senior year)  
Year/ 1 credit  
*Weighted Grading*

IB Biology HL I is an intensive science course which emphasizes basic biochemistry, cell structure and function, genetics, and botany. The IB student will become a “scientist” by researching core concepts in biology, using inquiry to formulate critical questions, applying scientific methodology to those questions, and communicating findings to others using appropriate scientific vocabulary and information technology. Internationalism is a strong focus of this course as students will explore the international perspectives of various environmental, social and ethical issues in the area of biology. Instruction is student-centered with cooperative learning and self-evaluation opportunities. Student learning will occur through readings, lectures, class discussions, activities and laboratory investigations.

**9091B/9092B   IB BIOLOGY HL II**  
Prerequisite: IB Biology HL I  
Grade: 12  
Year/ 1 credit  
*Weighted Grading*

IB Biology HL II is a continuation of IB Biology HL I. Human physiology and nutrition ecology and evolution will be researched using the same methods as IB Biology HL I. Internationalism will continue to be an integral part of this course as students continue to realize the global impact of biology. Students will complete all IB required assessments in this course. These include a Group 4 interdisciplinary project, internal assessment, and three external assessments.



**6573/6574 PRINCIPLES OF ENGINEERING (ENGINEERING LEVEL III)**

Prerequisite: Introduction to Engineering

Grades: 10, 11, 12

Year/ 1 credit

(Semester 1 = .5 credit Engineering and Technology)

(Semester 2 = .5 credit Science)



This STEM course makes a contribution to the curriculum by providing opportunities for students and teachers to link content together and apply it to solve problems. More and more jobs demand advanced skills, requiring that people be able to learn, reason, think creatively, make decisions, and solve problems. An understanding of science, technology, engineering and math and their methods contribute in an essential way to these skills. Principles of Engineering is a team based advanced course designed for most students. The Principles of Engineering courses intention and purpose is to educate students in a "main line" method providing STEM education for everyone. While providing a STEM based education for all students, those interested in becoming practicing engineers clearly benefit from this course content.