

Biology
Chemistry
Astronomy
AP Biology
AP Chemistry
Environmental Science
AP Environmental Science
Forensic Science
Geology
Human Anatomy & Physiology
Introduction to Organic Chemistry
Physics
AP Physics I
AP Physics C
Physical Science
STEM Research
Career Internship Program

Science



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Science Department Philosophy

All high school students need a broad background in science. To attain a broad background, all students should complete at least three years of science including one course each in biology, chemistry, and physics. If these three core courses are completed by the end of junior year, students have maximized their opportunities to do well on standardized tests, such as SAT, and will be prepared for further study of science during their senior year.

An important component of all science courses is laboratory work. Laboratory work gives students direct contact with the material studied in the course, develops lab skills, increases a student's understanding of how science actually works, and helps the student develop analysis, interpretation, and synthesizing skills.

Science Sequences

There are many science sequences that students may select because of their interests and career plans. The sequences shown below are intended to provide a solid background in science and not restrict students in their choices. Other sequences are possible when students, with input from teachers, counselors and parents, choose different course levels for biology, chemistry, and/or physics.

General Information

- Two credits in science are required for graduation. However, courses in biology, chemistry, and physics should be included in every student's four year academic plan to provide a balanced preparation for future vocational and/or educational goals.
- Most colleges require at least two credits of a laboratory science for admission and some (especially Illinois universities) require three. Many colleges and universities suggest a three or four year sequence for students entering engineering, medicine and the health services, home economics, and computer sciences.
- Most colleges recommend both natural and physical science experience.

Science Placement into Academic Ability Levels

The Division Chair recommends placement for incoming freshmen based upon an integrated analysis of the following performance indicators:

1. standardized test scores on the MAP test
2. information from the eighth grade teachers

Science and Advanced Placement (AP)

The Science Department offers preparation for AP examinations in four areas.

1. **AP Biology**

AP Biology is the suggested course to prepare for the AP examination in biology or related examinations given by various colleges and universities. As the course descrip-

tion indicates, it is equivalent to two semesters of college biology.

2. **AP Chemistry**

The AP Chemistry course is the equivalent of one or two semesters of college chemistry. AP Chemistry uses the College Board syllabus to prepare students for the AP examination in chemistry.

3. **AP Physics C**

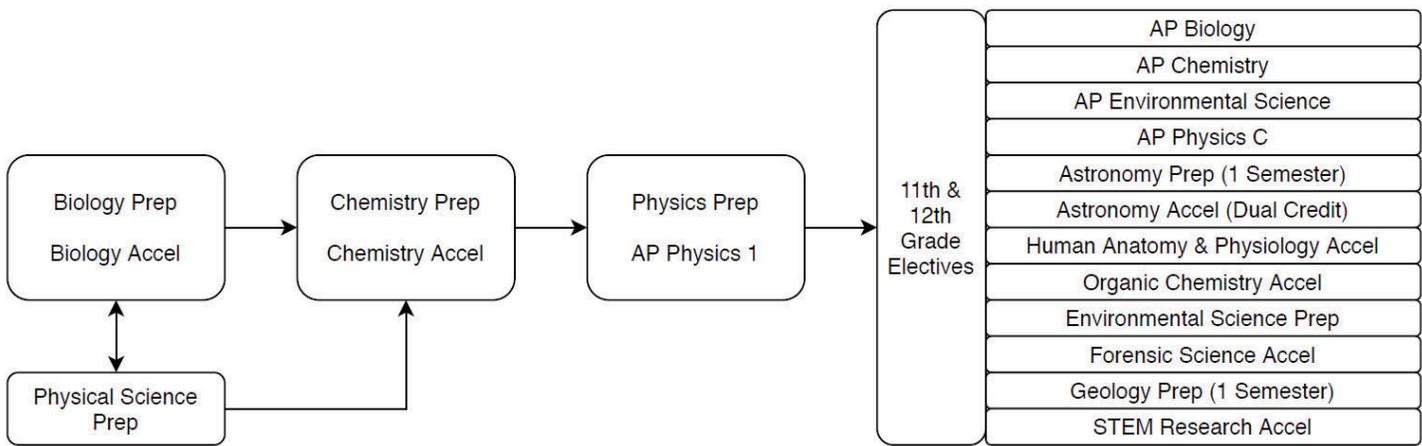
AP Physics C is a calculus-based university physics course and covers all of the material traditionally offered in the introductory college courses of engineering science and other related fields. As a result, the AP Physics C course students will be prepared for both AP Physics C examinations: Electricity and Magnetism, and Mechanics.

4. **AP Physics I**

AP Physics I is an algebra-based physics course and covers mechanics, rotation and sound. This course is equivalent to one semester of college physics.

5. **AP Environmental Science**

AP Environmental Science is the course to prepare students for the AP examination in environmental science. The course is equivalent to one semester of college environmental science.



Science Department Standards

As a result of their core science courses (biology, chemistry, physics) students will be able to know and apply...

1. the concepts, principles, and processes of scientific inquiry to investigate questions, conduct experiments, and solve problems.
2. concepts that explain how living things function, change, and adapt.
3. concepts that describe how living things interact with each other and with their environment.
4. concepts that describe properties of matter and energy and the interactions between them.
5. concepts that describe force and motion and the principles that explain them.
6. concepts that describe the features and processes of the Earth and its resources.
7. concepts that explain composition and structure of the universe and Earth's place in it.
8. the accepted practices of science.

- **Independent Study** Under specific conditions as outlined on p. 25 of the **Guide**, students may make application for Independent Study. In all cases, students must secure parent, teacher, counselor, divisional, and building administration approval. Independent Study may not be taken as an 8th semester/annual course.

Astronomy (Prep)

Credit: 1/2	Level: III
Grade Offered: 11, 12	
	Fall SN5311
	Spring SN5312

Prerequisite: One year of science

Astronomy is the oldest of all sciences. It began as an attempt by people to understand the world around them. Even today, people wonder what lies beyond our planet. Astronomy is the laboratory study of the night sky, our solar system, and objects which make up the universe. The origin, evolution, and future of our solar system, galaxy, and universe will be studied, and the existence of black holes and other cosmic oddities will be discussed. Students will learn about the history and future of space exploration, and how the science of astronomy, however old, is always changing. Students cannot level change into Astronomy (Accel) from this class.

Astronomy (Accel)

Credit: 1	Level: IV
Grade Offered: 11, 12	
	Annual SN7311
	SN7312

Prerequisite: One year of natural science & Physics (Chemistry strongly recommended)

Astronomy is the oldest of all sciences. It began as an attempt by people to understand the world around them. Even today, people wonder what lies beyond our planet. Astronomy is the laboratory study of the night sky, our solar system, and objects which make up the universe. The study of astronomy and space science requires knowledge of biology, chemistry, and physics. In this course, techniques used by amateur and professional astronomers will be incorporated, students will learn to identify objects in the night sky and make predictions of celestial events such as eclipses. The origin, evolution, and future of our solar system, galaxy, and universe will be studied, and the existence of black holes and other cosmic oddities will be discussed. Students will learn about the history and future of space exploration, and how the science of astronomy, however old, is always changing. Students cannot level change into Astronomy (Prep) from this class. **This course can earn dual credit through Moraine Valley.**

Biology (Prep)

Credit: 1	Level: III
Grade Offered: 9, 10	Annual SN5116
	SN5117
11, 12	Annual SN5111
	SN5112

Prerequisite: None

In this college preparatory course, students will explore scientific phenomena through the solving of problems using the science practices as prescribed by the Next Generation Science Standards. Classroom instruction will be based on questioning and on the use of real-world phenomena to increase student understanding and learning through application of biological concepts. Real world phenomena will elicit student questions and allow them to integrate the science ideas to gain a deep learning experience. The course involves assessing student progress throughout, ultimately encouraging students as self-directed, competent learners.

- **Independent Study** Under specific conditions as outlined on p. 25 of the **Guide**, students may make application for Independent Study. In all cases, students must secure parent, teacher, counselor, divisional, and building administration approval. Independent Study may not be taken as an 8th semester/annual course.

AP Chemistry

Credit: 1
Grade Offered: 11, 12

Level: V
Annual SN8211
SN8212

Prerequisite: One year of a natural science and one year of Chemistry (Accel) with a grade of B or better or Chemistry (Prep) with a grade of A (Physics strongly recommended)

AP Chemistry is intended to provide a college level course in chemistry for interested and capable students. Students considering careers in technical fields such as chemistry, chemical engineering, general engineering, and medicine, or for careers in areas where a knowledge of chemistry will be required, should consider this course. Those who complete the course may take the AP examination in Chemistry. This course is equivalent to two semesters of college chemistry. Topics include electronic and atomic structure, stoichiometry, reactions, thermochemistry, periodicity, bonding, intermolecular forces, kinetics, equilibrium, acids and bases, thermodynamics, and electrochemistry.

Environmental Science (Prep)

Credit: 1/2 or 1
Grade Offered: 11, 12

Level: III
Fall SN6011
Spring SN6012

Prerequisite: One year of science

General interest topics of ecology, population, politics, pollution, and other vital problems of survival of mankind are covered. The course provides the student with an awareness of our world and ways the student can help improve its quality. Students must participate in research in the form of discussion and reports. Field trips, lectures, and lab projects will supplement the research. The course may be taken for either semester independently or for the full year since topics do not overlap.

AP Environmental Science

Credit: 1
Grade offered: 11, 12

Level: V
Annual: SN8511
SN8512

Prerequisites: One year of a natural science and one year of a physical science (Chemistry or Physics) (Both Chemistry and Physics strongly recommended)

AP Environmental Science is an ecology course which allows students to apply many of the principles learned in biology, chemistry, and physics to better understand the biosphere and the environmental and economic choices facing contemporary society. Topics include: sustaining terrestrial and aquatic biodiversity; the history of the modern environmental movement; ecological principles; climate, weather, and biomes; the harvesting and use of renewable and non-renewable energy resources; petrochemicals, hazardous wastes, and toxicology; human population growth; soil and water resources; food and agriculture; mining and solid waste; the atmosphere and air pollution; climate change and ozone depletion; renewable resource sustainability and environmental ethics. Field trips are an integral part of this course and are therefore mandatory. Students cannot level change into Environmental Science (Prep) from this class.

Forensic Science

Credit: 1
Grade Offered: 11, 12

Level: IV
Annual SN7511
SN7512

Prerequisite: One year of Biology and one year of Chemistry

This course is designed to familiarize those individuals interested in criminalistics and/or related fields with the methods and techniques currently employed by forensic scientists. It involves the collection, examination, evaluation and interpretation of evidence through the use of biological, chemical and behavioral sciences as employed by our justice system, while gaining a basic understanding of the capabilities and limitations of the application of forensic science to the law. This course involves components from all of the sciences including content from Biology, Chemistry, Physics, Math and ELA Writing Skills. Forensic students will use critical thinking, deductive reasoning, advanced chemical laboratory techniques and problem-solving skills. Reality and research-based activities are used to investigate criminal scenarios; the scientific method is used for col-

lecting and analyzing evidence through case studies and simulated crime scenes such as fingerprinting, ballistics and blood spatter analysis.

Geology (Prep)

Credit: 1/2	Level: III
Grade Offered: 11, 12	Fall SN6121
	Spring SN6122

Prerequisite: One year of science

This course is an introductory, hands-on look at the geologic study of our Earth and is designed for students interested in understanding more about our Earth. Students will learn about four general areas of study: (1) The Rocks and Minerals on our Earth (2) Topography of the Earth's surface (3) Dynamic Processes that shape our earth such as earthquakes, volcanoes, and mountain Building (4) Earth History, a study of the geologic time scale and how earth has changed over time.

Human Anatomy and Physiology (Accel)

Credit: 1	Level: IV
Grade Offered: 11, 12	Annual SN9511
	SN9512

Prerequisite: One year of natural science and one year of Chemistry

Essential principles of human anatomy and physiology are presented including basic chemistry, cell and tissue studies, and an overview of body systems including skeletal, muscular, cardiovascular, respiratory, nervous, endocrine, reproductive, digestive, excretory, and immune. Dissection and computer technology will be an integral part of the course. Some comparative anatomy and physiology will be included especially while completing the dissections.

Introduction to Organic Chemistry (Accel)

Credit: 1	Level: IV
Grade Offered: 11, 12	Annual SN5811
	SN5812

Prerequisite: One year of natural science and one year of Chemistry

This course is offered to give students who will take organic chemistry in college an advantage over the usual chemistry background. This includes those students who wish to go into one of the following fields: medi-

cine, dentistry, pharmacology, nursing, home economics, biology, chemistry, and related fields. Students become familiar with the naming and structure of organic compounds. A knowledge of some of the basic reactions of organic chemistry is gained through laboratory work and study of lecture materials. Topics include alkanes, alkenes, alkynes, aromatics, alcohols, aldehydes, ketones, acids, amines, amides, and spectroscopy.

Physical Science (Prep)

Credit: 1	Level: III
Grade offered: 9, 10	Annual SN4516
	SN4517

Prerequisite: None

Physical Science is a lab-based course which provides comprehensive practice and assessment of science skills. This course will cover chemistry, physics and earth science concepts while using the scientific method. Emphasis is placed on problem-solving, measuring, analyzing data and higher-order thinking skills such as inferring, questioning, designing experiments and drawing conclusions. Physical Science is a solid preparation for Biology, Chemistry, Physics and other advanced science courses.

Physics (Prep)

Credit: 1	Level: III
Grade Offered: 11, 12	Annual SN4911
	SN4912

Prerequisite: Completion of Algebra (Prep) or higher

Physics is fundamental to all other sciences. The ideas and concepts are related to other sciences and mathematics. This course is laboratory centered. Laboratory activities are used to teach the main ideas. An activity is used to introduce an idea, then it is taught at the conceptual level, and finally an activity is used as an application of this idea. Topics include fundamental concepts of scientific thinking, motion, momentum, energy, electricity, and magnetism.

AP Physics I

Credit: 1	Level: V
Grade Offered: 10	Annual SN8116 SN8117
11, 12	Annual SN8111 SN8112

Prerequisite: Completion of Algebra II (Prep) or Geometry (Accel) or higher and Chemistry

AP Physics I is an algebra-based college level physics course. This is a laboratory study for student discovery of the physical universe. Major topics of study include: motion, energy, dynamics, momentum, light and sound. This is a first year physics course and is equivalent to one semester of college level physics. Students can take AP Physics C as a second year course.

AP Physics C

Credit: 1	Level: V
Grade Offered: 11, 12	Annual SN8411 SN8412

Prerequisite: One year of natural science and AP Physics I with a grade of B or better or Physics (Prep) with a grade of A and completion or concurrent enrollment in Calculus AB or BC

AP Physics C is a calculus-based college level physics course. This course would be ideal for those planning a career in engineering, medicine, science, math, health-related fields, or any technical field. Major topics studied are mechanics, electricity, and magnetism. Supplemental topics may include thermodynamics, physical and geometric optics, and modern physics. Understanding of basic principles and application of these principles in problem solving are the major goals of this course. Those who take the course may take the AP examination in Physics. This course is equivalent to two semesters of college physics. As a result of this course, students will be prepared for both AP Physics C examinations: Electricity and Magnetism, and Mechanics.

STEM Research

Credit: 1	Level: IV
Grade Offered: 11, 12	Annual SN7611 SN7612

Prerequisite: 2 years of science

This course is designed for independent and academically driven juniors or seniors who have completed at least 3 years of laboratory science and math (or who are concurrently enrolled in their third year) who are interested in pursuing research in the fields of science or engineering. Each student will have the opportunity to develop an open-ended research project that he or she will have the entire year to investigate using scientific laboratory or engineering design techniques. The student will be responsible for planning and implementing each phase of their project. Each student will have the opportunity to connect with an “e-mentor” who is an expert in the area the student is investigating and for maintaining collaboration with that professional throughout the year. Students will read scientific journals, develop hypotheses, collect and analyze data, perform statistical analyses, create a formal research poster, and write a formal research paper which will be submitted to local, state, and national/international science competitions.

Career Internship Program

Credit: 1/2 (dc)	Level: IV
Grade Offered: 11, 12	Fall SN5551 Spring SN5552 Summer SN5558 SN5559

This course is designed for the career-minded student who is seeking work experience in an area that the student wishes to pursue upon graduation or after attending college. The student will apply for the internship through the department that they wish to receive credit. The student will work a minimum of 90 hours during the semester for credit for the course. The student will have weekly contact with the supervising teacher, develop a culminating project based upon the experience, be evaluated by the supervising teacher and the employer for the final grade. The student is responsible for their own transportation to and from the work place. This course may be taken for duplicate credit. It is the sole discretion of each department team to recommend the student for a work internship. Application does not guarantee admission.

Science Classes

When choosing Annual Courses, you will need the first and second semester codes.

Freshman Courses

Annual

SN5116/7	Biology Prep
SN7116/7	Biology Accel
SN4516/7	Physical Science Prep

Sophomore Courses

Annual

SN5116/7	Biology Prep
SN7116/7	Biology Accel
SN5616/7	Chemistry Prep
SN7216/7	Chemistry Accel
SN4516/7	Physical Science Prep
SN8116/7	AP Physics I

Junior and Senior Courses

Annual

SN7311/2	Astronomy Accel
SN5111/2	Biology Prep
SN8311/2	AP Biology
SN5611/2	Chemistry Prep
SN7211/2	Chemistry Accel
SN8211/2	AP Chemistry
SN8511/2	AP Environmental Science
SN7511/2	Forensic Science
SN9511/2	Human Anatomy & Physiology Accel
SN5811/2	Introduction to Organic Chemistry Accel
SN4911/2	Physics Prep
SN8111/2	AP Physics I
SN8411/2	AP Physics C
SN7611/2	STEM Research

Fall Only

SN5311	Astronomy Prep
SN6011	Environmental Science Prep
SN6121	Geology Prep

Spring Only

SN5312	Astronomy Prep
SN6012	Environmental Science Prep
SN6122	Geology Prep

Did You Know?

20 High-Paying Science Careers for the Next Decade

- Surgeon
- Anesthesiologist
- Internist
- Dentist
- Oral Surgeon
- Nurses
- X-ray technician
- Physician Assistant
- Psychiatrist
- Environmental Consulting
- Natural Sciences Manager
- Mining
- Petroleum
- Green Energy
- Civil Engineer
- Aerospace Engineering
- Astronomy
- Engineering Manager
- Nanotechnology
- Materials Science

A recent U.S. Department of Commerce study shows that over the past 10 years, growth in Science, Technology, Engineering and Mathematics (STEM) jobs was three times greater than that of non-STEM jobs. The report also shows that STEM jobs are expected to continue to grow at a faster rate than other jobs in the coming decade.

Have you ever considered a career as a...



Acoustical Research Engineer
 Aeronautical Engineer
 Agricultural Engineer
 Anneal Physiology
 Archeologist
 Assembling Engineer
 Astrogeologist
 Astronaut
 Astronomer
 Astrophysicist
 Audio Engineer
 Bioanalyst

Biochemist
 Botanist
 Cardiologist
 Chemical Engineer
 Chemist
 Computer Scientist
 Cytogeneticist
 Dentist
 Education
 Engineer
 Entomologist
 Food Science
 Food Science Technician
 Forensic Anthropologist
 Forensic Chemist
 Forensic Scientist
 Forestry
 Geologist
 Geoscientist
 Health Care Worker
 Herpetologist
 Horticulturist
 Life Science Writer

Marine Biologist
 Molecular Biologist
 Neurobiologist
 Oceanographer
 Physical Trainer
 Physicist
 Plant Ecologist
 Plant Geneticist
 Plastic Surgeon
 Psychologist
 Quality Insurance Engineer
 Researcher
 Solid State Chemist
 Space Scientist
 Staff Scientists
 Structural Engineer
 Surgeon
 Systems Engineer
 Veterinarian
 Water Resources Engineer
 Wildlife Biologist
 Wildlife Ecologist
 Wildlife Psychologist
 Zoo Keeper
 Zoologist