Biology
Chemistry
Physics
Physical Science
Astronomy
Environmental Science
Food Science
Geology
Human Anatomy & Physiology
Organic Chemistry
AP Biology
AP Chemistry
AP Physics C

Science

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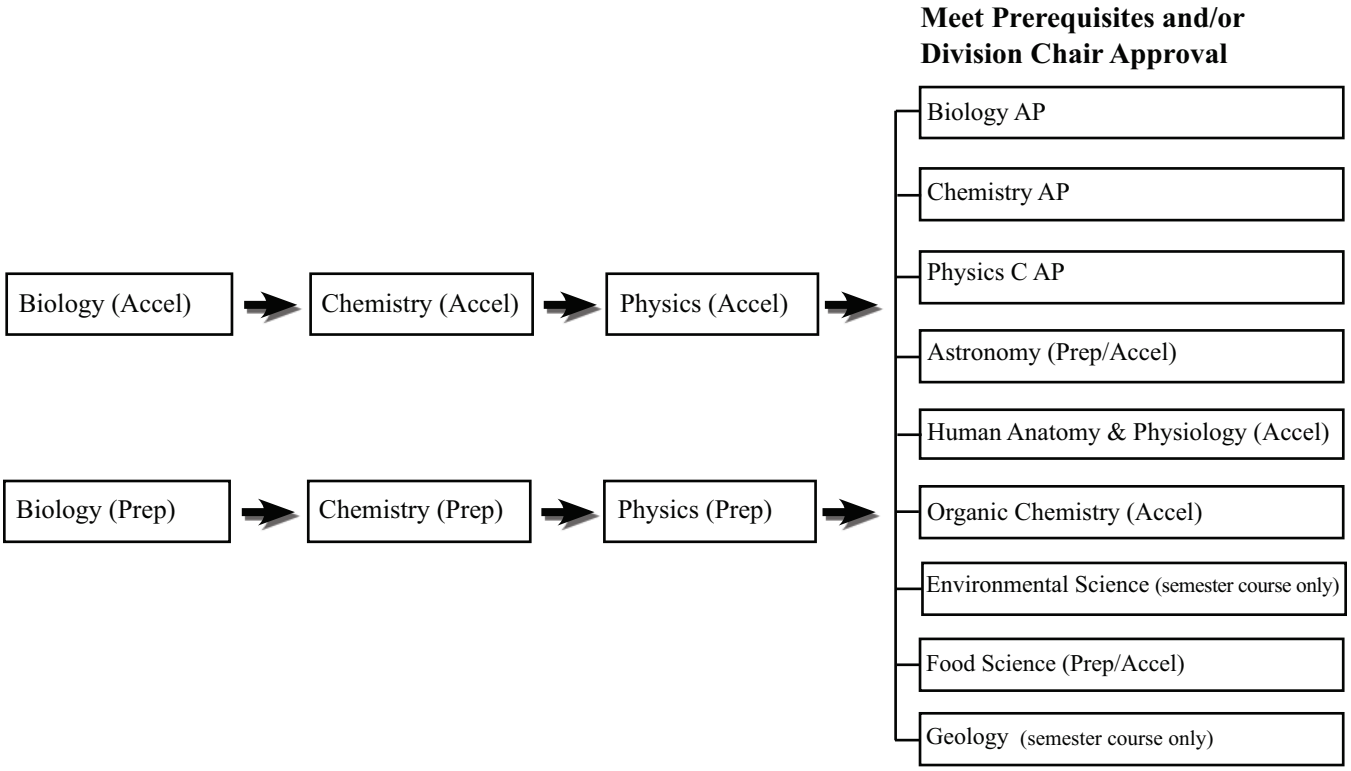
Science Department Philosophy

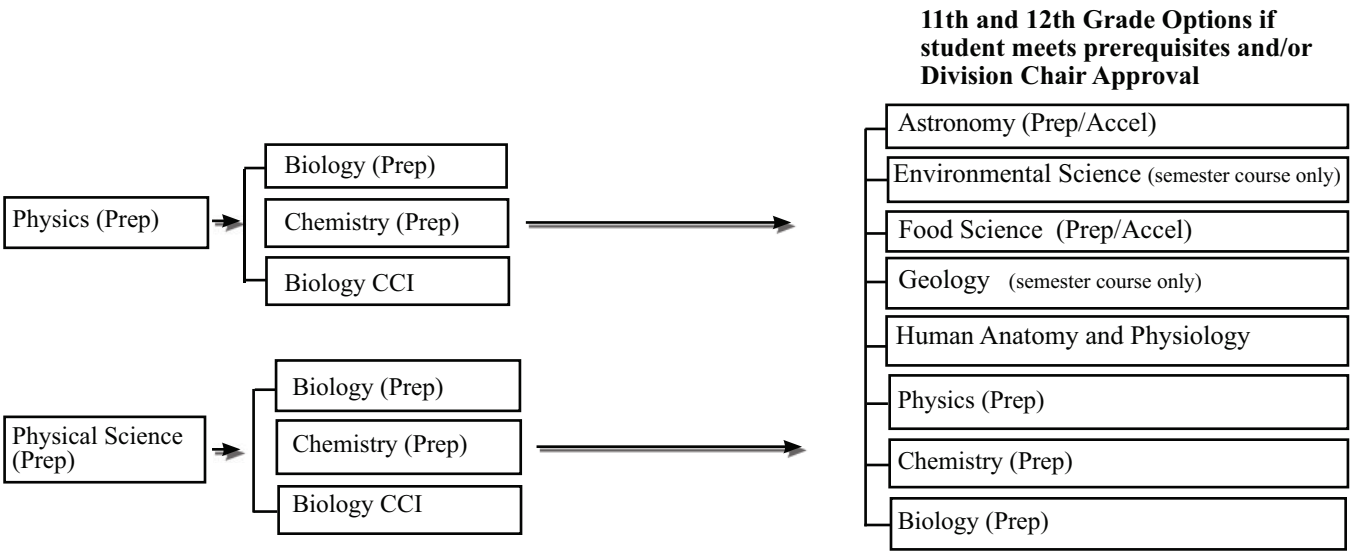
All high school students need a broad background in science. To attain a broad background, all students should complete at least three years of science. The three years of science should consist of one course each in biology, chemistry, and physics. If these three foundation courses are completed by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

An important component of all science courses is laboratory work. Lab 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.





Other Science Electives North Campus 11-12
• Inter-Disciplinary Workshop (IDW) (Grade 11 only)

General Information

- Two credits in science are required for graduation. A course 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.

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

Student scores may not all fall within a single range for a given course. If there is a preponderance of scores in one range, that range is normally the determining factor for placement. Students who are borderline for a given ability level course are encouraged to work in the higher ability level course.

Science and Advanced Placement (AP)

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

1. **Biology AP**
   Biology AP is the suggested course to prepare for the AP examination in biology or related examinations given by various colleges and universities. As the course description indicates, it is equivalent to two semesters of college biology.

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

3. **Physics C AP**
   Physics C AP is a college level physics course for those students whose post-high school plans call for a major in engineering science, the physical sciences, astronomy, medicine, or any related technical field. Physics C AP is a calculus-based university physics course and covers all of the material traditionally offered in the introductory course of colleges of engineering science and other related fields. As a result, of the Physics C AP course students will be prepared for both Physics C AP examinations: Electricity and Magnetism, and Mechanics.

- **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

Credit: 1 Level: III and IV
Grade Offered: 11, 12 Level III Annual 35310
Level IV Annual 37310
Prerequisite: Completion of biology, chemistry, and physics (level III or greater) **or** concurrent enrollment in one of the previously listed classes **and** completion of the other two.

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.

Biology (Prep)

Credit: 1 Level: III
Grade Offered: 9, 10 Annual 35115
11, 12 Annual 35110
Prerequisite: None

This college preparatory course focuses on an understanding of life and major life processes. Emphasis is placed upon unifying principles and concepts applicable to all life forms and the adaptations of diverse organisms to carry out fundamental functions. The objectives of the course are met through laboratory work, demonstration, lecture, homework, and visual aids. This preparatory course is planned for students who have attained basic skills and who are working toward higher competencies. Generally, students who are enrolled in English (Prep) enroll in this course. This course moves at a pace that allows frequent review and checks for understanding.

New Course

Biology Cross Curricular Integration (CCI)

Credit: 1 Level: III
Grade Offered: 10 Annual 35225

Prerequisite: Recommendation from Humanities or by English or Math/Science chair approval

Biology CCI is one course of a two hour block that combines biology, language arts and reading. Students will study biology in a project-based setting with a focus on an understanding of life and major life processes. The objectives of this course are met through traditional science methods such as laboratory work, demonstration, lecture, homework and visual aids combined with the interpersonal communication skills, reading strategies and writing competencies of a language arts classroom. This course may only be taken in conjunction with English Cross Curricular Integration (CCI).

Biology (Accel)

Credit: 1 Level: IV
Grade Offered: 9, 10 Annual 37115
Prerequisite: None

This college preparatory course focuses on an understanding of life and major life processes. Emphasis is placed upon unifying principles and concepts applicable to all life forms, and the adaptations of diverse organisms to carry out fundamental functions. The objectives of the course are met through laboratory work, demonstration, lecture, homework, and visual aids.

Biology (Accel) explores biological topics in greater depth than does Biology (Prep) and provides greater opportunity for involvement in AP course offerings at the junior/senior level. This course is planned for students with above average reading comprehension and writing skills. Generally, students who are enrolled in English and mathematics courses at the Accel level enroll in this course.

- **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.

Biology AP

Credit: 1 Level: V
Grade Offered: 11, 12 Annual 38310
Prerequisite: Biology (Accel) with a grade of B or better or Biology (Prep) with grade of A, and approval of division chair.
Recommended: Chemistry

Biology AP is a second course in biology offered to those students who have successfully completed the first level course. Taught at the college level, it is considered to be the equivalent of two semesters of college biology. The content is laboratory oriented. Areas covered in the course are plant growth and development, comparative vertebrate anatomy, animal physiology, genetics, microbiology, embryology, and a review of the basic principles of biology. Animals dissected for study in comparative vertebrate anatomy include the Amphioxus and one mammal (cat, rabbit, or mink). Human physiology is also an important part of the course. The program prepares students for the AP examination in Biology or comparable examinations.

Chemistry (Prep)

Credit: 1 Level: III
Grade Offered: 10 Annual 35615
11, 12 Annual 35610
Prerequisite: C or better in Algebra I (Prep), or completion of Algebra IA and IB with a C or better, or concurrent enrollment in Algebra II (Prep) or Intro Alg. II/Finite

Chemistry is the study of composition and structure of matter and the changes that matter undergoes, and the energy associated with those changes. Principles of chemistry as well as applications of chemistry are emphasized. Chemical concepts are developed through the use of mathematical relationships and are reinforced through laboratory activities. This course is not recommended for students who plan to major in science in college.

Chemistry (Accel)

Credit: 1 Level: IV
Grade Offered: 10 Annual 37215
11, 12 Annual 37210
Prerequisite: A grade of C or better in Algebra I (Accel) or a grade of B or better in Algebra I (Prep)
Recommended: Biology

Chemistry is the study of the composition and structure of matter, the changes matter undergoes, and the energy associated with those changes. Chemistry concepts are reinforced through laboratory activities. This course moves at a faster pace than Chemistry (Prep), while covering a greater range of topics to a greater depth. Mathematics is an integral part of the course. Out of class reading and comprehension are key to success in this course, and students will be expected to independently acquire information.
This course is intended to prepare students for further study in the sciences or technology.

Chemistry AP

Credit: 1 Level: V
Grade Offered: 11, 12 Annual 38210
Prerequisite: Chemistry (Accel) with grade of B or better, and Physics

Chemistry AP is intended to provide a college level course in chemistry for interested and capable students who are 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. 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

Credit: 1/2 | Level: III
Grade Offered: 11, 12 | Fall 36011 | Spring 36012
Prerequisite: One year of high school 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 he/she, as a citizen, 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.

Food Science

Credit: 1 | Level: III and IV
Grade Offered: 11, 12 | Annual 39210
Prerequisite: None

This course utilizes the scientific method of study to investigate the chemical components and physical properties of various food and how food reacts when different preparation and cooking methods are used. Dietary concepts are studied with emphasis on how nutrition, wellness, and the body's utilization of food are related. Students will learn various ways food is preserved, processed, and prepared. Homework and projects are a large part of this course.
Since the course will be taught by both a FCS teacher and a science teacher, students may receive either Practical Arts or Science credit.

Geology

Credit: 1/2 | Level: III
Grade Offered: 11, 12 | Fall 36121
Prerequisite: l year of science | Spring 36122

This course is an introductory, hands-on look at the geologic study of our Earth and is designed for the student interested in understanding more about the earth he/she lives on. The student will be exposed to geology in four general areas of study: (1) Earth Materials, a study of what the earth is composed of and how people use or misuse these materials; (2) Interpretation of the Earth's Surface, a study and application of topographic and geologic map reading as well as air photo study; (3). Physical Geology, a study of the forces that act upon within the earth and (4) Earth History, a study of the geologic evolution of earth and the possible causes for the evolution.

Human Anatomy and Physiology

Credit: 1 | Level: IV
Grade Offered: 11, 12 | Annual: 39510

Prerequisite: Completion of biology, chemistry, and physics (level III or higher), **or** concurrent enrollment in one of the previously listed classes **and** completion of the other two.

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.

Inter-Disciplinary Workshop (IDW)

Credit: 1 | Level: III
Grade Offered: 11 | Annual 00770

Prerequisite:
- Must be enrolled in at least two of the following: English III (Prep), U.S. History (Prep), American Studies (Prep), a mathematics course, a science course.
- Recommendation from previous year's English, math, science, and/or World History teachers.
- All applicants will be reviewed by th Student Achievement Team to affirm appropriateness of enrollment.

IDW is designed for students who need extra help in order to succeed in English III (Prep), U.S. History (Prep), American Studies (Prep), math, or science courses. It is a skills-building/reinforcing program. It is also a program for students who had success with academic support programs at South Campus, or for those who have academic challenges in core courses such as English, math, science, and social studies. Students in this class are expected to work independently on history, English, math, and/or science assignments; integrated assignments; and to seek help when needed. Weekly writing tutorials are also part of the curriculum. Students enrolled in IDW need to demonstrate a willingness to participate in the program and display a constant effort to achieve. An IDW contract must be signed by both students and their parents/guardians prior to participation in this course. IDW is taken as a general elective credit.

Introduction To Organic Chemistry

Credit: 1 Level: IV
Grade Offered: 11, 12 Annual
35810
Prerequisite: Chemistry with a grade of B or better

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: medicine, 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 34515
Prerequisite: None

Physical Science is a lab-based course which provides comprehensive practice and assessment of science skills. 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. The course will cover chemistry, physics and earth science concepts. Physical Science is a solid preparation for Biology, Chemistry, Physics and other advanced science courses.

Physics (Prep)

Credit: 1 Level: III
Grade Offered: 9, 10 Annual 34915
11, 12 Annual 34910
Prerequisite: Completion of or concurrent enrollment in Algebra I (Prep), Algebra I (Accel), or Algebra I B

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, gravity, rotational dynamics, waves, sound, light, electricity, magnetism, and quantum and nuclear physics.

Physics (Accel)

Credit: 1 Level: IV
Grade Offered: 11, 12 Annual 37410
Prerequisite: Geometry (Accel) or Algebra II (Prep)

Physics is a fundamental science whose concepts and ideas are related to and utilized by all other sciences. Physics (Accel) is a laboratory study for student discovery of the physical universe. Experiments are an integral part of the course and when possible serve as the primary learning source. In this course, fundamental concepts of motion, energy, dynamics, momentum, light, electricity, magnetism, and quantum physics are developed. Physics (Accel) is a college preparatory course and would be beneficial to any student planning to continue his/her education.

Physics C AP

Credit: 1 Level: V
Grade Offered: 11, 12 Annual 38410
Prerequisite: Grade of B or better in Physics (Accel), and completion or concurrent registration in a calculus program in mathematics

Physics C AP 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 Physics C AP examinations: Electricity and Magnetism, and Mechanics.

Science Classes

Freshman Courses
30005 Science TBA (No Test)
35115 Biology Prep
37115 Biology Accel
34915 Physics Prep
34515 Physical Science Prep

Sophomore Courses
Annual
35115 Biology Prep
35225 Biology CCI
37115 Biology Accel
35615 Chemistry Prep
37215 Chemistry Accel
34915 Physics Prep
34515 Physical Science Prep

Junior and Senior Courses
Annual
35310 Astronomy Prep
37310 Astronomy Accel
35110 Biology Prep
38310 Biology AP
35610 Chemistry Prep
37210 Chemistry Accel
38210 Chemistry AP
39210 Food Science
39510 Human Anatomy & Physiology
35810 Intro to Organic Chemistry Accel
34910 Physics Prep
37410 Physics Accel
38410 Physics AP - C
Fall Only
36011 Environmental Science
36121 Geology
Spring Only
36012 Environmental Science
36122 Geology

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.

Did You Know?

Almost half of all biological scientists are employed by federal, state and local governments.*

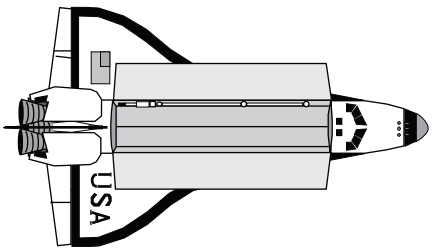
The median earnings for biochemists and biophysicists was the same ($63,390) in 2002.*

The top 5 fastest growing professional degree occupations between 2002 - 2012 are pharmacists, veterinarians, chiropractors, physicians, surgeons and optometrists.*

*** U.S. Department of Labor, Bureau of Labor Statistics**

44%

of all chemists and material scientists are employed in manufacturing firms.



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
- Criminalist
- 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