

Biology  
Chemistry  
Astronomy  
AP Biology  
AP Chemistry  
Environmental Science  
AP Environmental Science  
Earth & Space Science  
Forensic Science  
Human Anatomy & Physiology  
Introduction to Healthcare Careers  
Introduction to Organic Chemistry  
Medical Terminology  
Physics  
AP Physics I  
AP Physics C  
STEM Research  
Sustainable Urban Agriculture  
Career Internship Program

# *Science*

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## Science Department Mission Statement

To use the content of Science to develop ALL students into lifelong learners; adept at critical thinking, problem solving and collaborating.

### 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 evaluates the performance of each incoming student. Placement is based upon the following performance indicators.

- Information from the eighth grade teacher's about the incoming freshman using current math grades and student ability.
- LT will review the results and recommend further changes based on skills and supports.

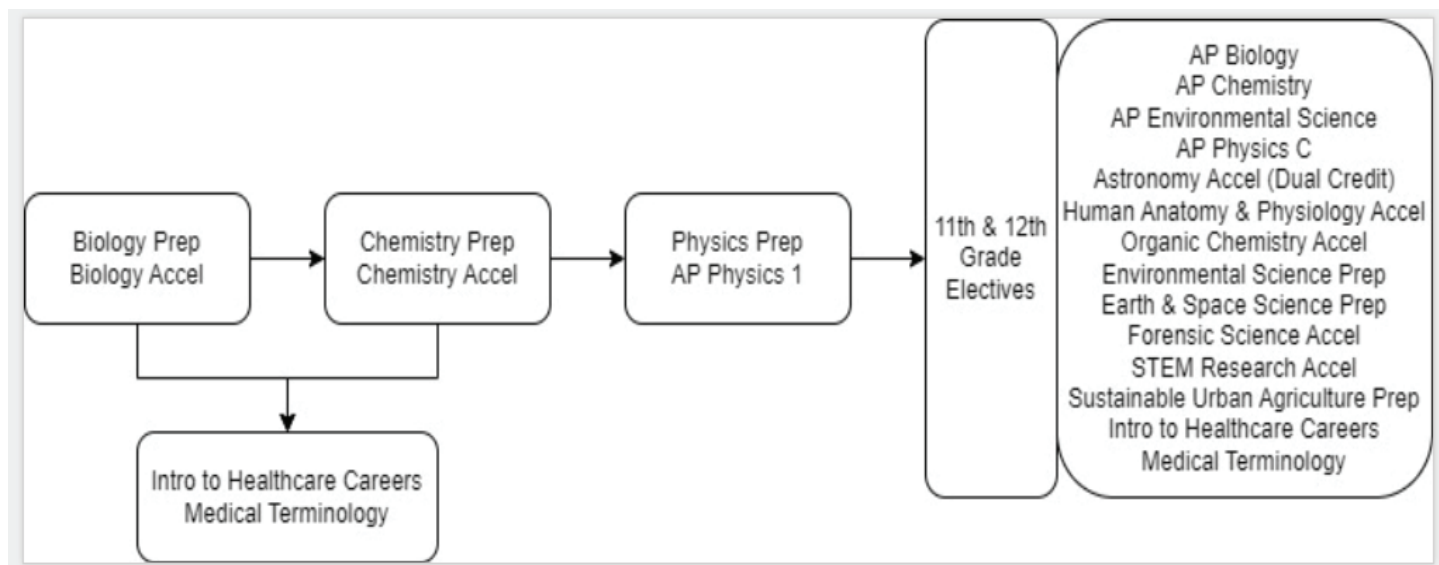
Parents are then notified of the final placement.

### Science and Advanced Placement (AP)

The Science Department offers preparation for AP examinations in five 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 description 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 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.
4. **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.
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.

## Course Sequences



## Science Department Standards

The LTHS Science Department utilizes the following eight principles in conjunction with both the Illinois State Standards and the Next Generation Science Standards. These principles and standards guide academic programs, courses, and challenge students. Additionally, specific academic course standards have also been developed. These are distributed to students at the beginning of each semester or annual course.

### LTHS Science Principles

#### NGSS Science and Engineering Practices

1. Asking Questions and Defining Problem
2. Planning and Carrying out Investigations
3. Using Mathematical and Computational Thinking
4. Developing and Using Models
5. Analyzing and Interpreting Data
6. Constructing Explanations and Designing Solutions
7. Engaging in Argument from Evidence
8. Obtaining, Evaluating, and Communication of Information

- 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 (Accel)

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Credit: 1	Level: IV
Grade Offered: 11, 12	
	Annual SN7311 SN7312
Prerequisite: One year of natural science & Physics (Chemistry strongly recommended)	

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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 may receive four lab science college credits with Moraine Valley upon successful completion of this dual credit course.

## Biology (Prep)

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Credit: 1	Level: III
Grade Offered: 9, 10	Annual SN5116 SN5117
11, 12	Annual SN5111 SN5112
Prerequisite: None	

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Biology is the study of living things and the basic processes of life. Students will explore scientific phenomena through the solving of problems using science practices. 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.

## Biology (Accel)

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Credit: 1	Level: IV
Grade Offered: 9, 10	Annual SN7116 SN7117
Prerequisite: None	

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Biology is the study of living things and the basic processes of life. Students will explore scientific phenomena through the solving of problems using science practices. Classroom instruction will be based on student-driven questioning and student-led exploration of real-world phenomena. The application of biological concepts to new and different contexts are a critical piece of the deeper learning experience in this course. The phenomena presented will elicit student questions and allow them to answer these questions by integrating the science ideas to gain a deeper understanding. Though different assessment methods are used to better understand student mastery, students in this course are expected to act as self-directed, competent learners who can assess their own progress.

## AP Biology

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Credit: 1	Level: V
Grade Offered: 11, 12	Annual SN8311 SN8312
Prerequisite: Biology	

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AP Biology 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, with an emphasis on inquiry-based investigations that provide students with opportunities to apply the science practices. Areas covered in the course are evolution, cellular processes, energy and communication, genetics, information transfer, ecology, and interactions. Dissection includes a cat as a representative mammal. The program prepares students for the AP examination in Biology.

## Chemistry (Prep)

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Credit: 1	Level: III
Grade Offered: 10	Annual SN5616 SN5617
11, 12	Annual SN5611 SN5612

Prerequisite: Completion of Algebra Prep or higher

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Chemistry is the study of the composition and structure of matter, the changes matter undergoes, and the energy associated with those changes. This course covers a range of topics using phenomenon driven curriculum. Chemistry concepts are reinforced through laboratory activities, classroom discussion and independent practice. A background in algebra, continuous practice and daily review are key to success in this course.

## Chemistry (Accel)

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Credit: 1	Level: IV
Grade Offered: 10	Annual SN7216 SN7217
11, 12	Annual SN7211 SN7212

Prerequisite: Completion of Algebra with a B or better

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Chemistry is the study of the composition and structure of matter, the changes matter undergoes, and the energy associated with those changes. This course covers a range of topics with depth at a fast pace. Chemistry concepts are reinforced through laboratory activities, classroom discussion and independent practice. A strong background in mathematics, continuous practice and daily review are key to success in this course.

## AP Chemistry

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Credit: 1	Level: V
Grade Offered: 11, 12	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)

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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.

## Earth and Space Science

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Credit: 1	Level: III
Grade Offered: 11, 12	Fall SN6211 Spring SN6212
Prerequisite: One year of science	

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This course will study the environment on Earth and the Earth's environment in space. Topics include the history and formation of the Earth, geology, astronomy, and meteorology. The course will utilize science practices developed in earlier courses to explore earth and space sciences and answer the following questions: What is the universe, and what is Earth's place in it? How and why is Earth constantly changing?

## Environmental Science (Prep)

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Credit: 1/2 or 1	Level: III
Grade Offered: 11, 12	Fall SN6011 Spring SN6012
Prerequisite: One year of science	

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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.



## Medical Terminology

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Credit: 1/2	Level: III
Grade Offered: 9, 10	Fall SN2126
	Spring SN2127
11, 12	Fall SN2121
	Spring SN2122

Prerequisite: None

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Course presents medical terminology through the study of medical word roots, prefixes, and suffixes. Focus on relationships among symptomatic, disease, and procedural terms. This course prepares students with the oral and written skills necessary to communicate in any health care field.

## Introduction to Organic Chemistry (Accel)

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

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

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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.

## Physics (Prep)

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

Prerequisite: Completion of Algebra (Prep) or higher

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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

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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

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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

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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

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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.

## Sustainable Urban Agriculture

Credit: 1/2 or 1	Level: III
Grade Offered: 11, 12	Fall SN8521 Spring SN8522
Prerequisite: 1 year of science	

This course provides an overview of sustainable urban agriculture with a strong focus on hands on food production. The course looks at the sustainability of food production at multiple levels: farm resources, community, regional, national and global. Students will gain a basic understanding of the environmental tradeoffs caused by conventional agriculture and understand the challenges to alternative forms of sustainable agriculture. Students will learn to think critically about where their food comes from, and be able to analyze the environmental, economic, and social costs and benefits involved in delivering food from farm to market. This class is intended for students with a general interest in sustainable food production systems. We will discuss a variety of ecological, social, and economic topics within the framework of sustainability. This course is designed to provide students with an overview of the agriculture and food industry. It will focus on introductory areas of agriscience, natural resource management, plant, animal and food science. After completing this course, students will be able to discuss the role of agriculture in our modern world, provide suggestions for conserving our air, water, soil and forestry resources, and grow and sustain crops. This course may be taken for either semester independently or for the full year since the topics do not overlap.

## 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 a student who has already secured an internship in partnership with their LT teacher in this department. Detailed information about qualifying for a Career Internship Program class can be found on page 10 of the Guide. It is the sole discretion of each department team to recommend a student for a career internship. An 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
SN2116/7	Intro to Healthcare Careers

## Sophomore Courses

### Annual

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

### Fall Only

SN2116	Intro to Healthcare Careers
SN2126	Medical Terminology

### Spring Only

SN2117	Intro to Healthcare Careers
SN2127	Medical Terminology

## 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
SN6211/2	Earth & Space 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

SN6011	Environmental Science Prep
SN2111	Intro to Healthcare Careers
SN2121	Medical Terminology
SN8521	Sustainable Urban Agriculture

### Spring Only

SN6012	Environmental Science Prep
SN2112	Intro to Healthcare Careers
SN2122	Medical Terminology
SN8522	Sustainable Urban Agriculture

# 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