

# Science

Course	Freshmen	Sophomores	Juniors	Seniors	Prerequisite
Biology S078	X	X			
Biology Regular S178, S802 (Bilingual), S702 (Category I grade weighting)	X	X	X	X	
Biology Honors S172, PS30	X				Department recommendation
AP Biology S173			X	X	Biology/Chemistry/3.50 GPA or Biology Honors/Chemistry Honors or department recommendation
Chemistry S181		X	X		GPA of 2.0 or higher
Chemistry Honors S182		X	X	X	Algebra and Biology (grade of B or better) or department recommendation
AP Chemistry S179			X	X	Grade of A in regular-level science or grade of A or B in honors-level science
Earth Science S188			X	X	3rd or 4th year of high school or dept. recommendation
Earth Science Honors S288			X	X	Two years of science
Physics S184			X	X	Algebra and Biology
Physics Honors S185			X	X	Biology Honors, Adv. Algebra and Trigonometry (concurrent enrollment permitted) or department recommendation
Principles of Technology T245			X	X	Minimum grade of C in two science classes
AP Physics C S189			X	X	Biology Honors and/or Physics Honors preferred, concurrent enrollment in Pre-Calculus or Calculus or department recommendation
AP Environmental Science S177				X	Senior standing or department recommendation
Physiology S187				X	Senior standing or department recommendation
Astronomy and Space Science S191			X	X	Minimum grade of C in two Mathematics courses
Astronomy & Space Science Honors S192			X	X	Concurrent enrollment in or successful completion of Chemistry and Geometry
Aviation Meteorology			X		Department recommendation
Aviation Physics			X		Department recommendation

Course	Freshmen	Sophomores	Juniors	Seniors	Prerequisite
Forensic Science S193				X	Chemistry and Advanced Algebra with Trigonometry
Geology S194			X	X	Two years of science
Meteorology S195			X	X	Two years of science

### **Biology S078**

*Grades 9, 10*

*Year course - 1 credit*

*Prerequisite: None*

Biology is a one year course designed to introduce basic biological principles. Focus is on reading comprehension and organization and scientific information. General biological principals such as: cells, genetics, kingdoms, and living things are covered and discussed.

### **Biology Regular S178, S802 (Bilingual), S702 (Category I grade weighting)**

*Grades 9-12*

*Year Course – 1 credit*

*Prerequisite: None*

Biology Regular is a one-year course, which deals with the study of living things and attempts to develop understandings of the 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. In addition to reading for information and class discussions, emphasis is placed on laboratory experiences.

### **Biology Honors S172, PS30**

*Grade 9*

*Year course – 1 credit*

*Prerequisite: Department recommendation*

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.

### **AP Biology S173**

*Grades 11, 12*

*Year course – 1 credit*

*Prerequisite(s): Biology/Chemistry/3.50 GPA or Biology Honors/Chemistry Honors or department recommendation*

This course provides an opportunity for students to pursue and receive credit for college level course work through national testing. The class is designed to be the equivalent of the general biology course taken during the freshman college year. Topics include: chemistry of life, cells, cellular energetic, heredity, molecular genetics, and evolutionary biology, diversity of organisms, structure and function of plants, animals, and ecology.

### **Chemistry S181**

*Grades 10, 11*

*Year course – 1 credit*

*Prerequisite: GPA of 2.0 or higher*

This course studies principals of atomic and molecular structure, bonding, stoichiometry, states of matter, kinetic molecular theory, and solutions. Corresponding laboratory experiments include volumetric and gravimetric analyses, a qualitative study of reactions, visible spectrophotometry, and problem-based analyses. It's intended for all students whose majors require general chemistry, including science majors and pre-professional. The course also satisfies a general education laboratory science requirement for students with previous chemistry experience.

## **Chemistry Honors S182**

*Grades 10-12*

*Year course – 1 credit*

*Prerequisite: Algebra and Biology (grade of B or better) or department recommendation*

This course is the study of the composition of substances and the changes they undergo. Chemistry Honors 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, textbook materials, and computer assisted instruction. Topics are covered at a faster pace with in-depth quantitative reasoning used as the focus for each topic of study. Independent student projects and scientific investigations are course requirements.

## **AP Chemistry S179**

*Grade 11, 12*

*Year course – 1 credit*

*Prerequisite: Grade of A in regular-level science or grade of A or B in honors-level science*

This is an advanced placement course designed to prepare the student for the AP Chemistry exam. The course covers the equivalent of one full year of college level General Chemistry, comparable to the first year course at the college or university. The course is a rigorous math-based course, with a strong laboratory component. It is intended for students who have demonstrated a willingness to commit considerable time to studying and completing assignments outside of class, and who have successfully completed a prior course in chemistry during high school. The course will develop the student's ability to incorporate mathematical skills in the solution of chemistry problems, both through the use of textbook problems and laboratory activities

## **Earth Science S188**

*Grades 11, 12*

*Year course – 1 credit*

*Prerequisite: 3rd or 4th year of high school or department recommendation*

This course provides the students with an understanding of the Earth. The topics of study include astronomy, weather, pollution, oceanography, maps and globes, rocks and minerals, glaciers, earthquakes, volcanoes, fossils and geologic time. Problem solving strategies and the scientific method are stressed.

## **Earth Science Honors S288**

*Grades 11, 12*

*Year course – 1 credit*

*Prerequisite: Two years of science*

This course provides the students with an understanding of the earth. The topics of study include astronomy, meteorology, oceanography, and geology. The student will study the interrelationships between the various branches of Earth Science. Lab work is a large part of this course. Problem-solving strategies, graphing and the scientific methods will be stressed.

## **Physics S184**

*Grades 11, 12*

*Year course – 1 credit*

*Prerequisite: Algebra and Biology*

This course is designed for students following a sequence of courses in the general or college prep curricula. Successful completion will provide a laboratory science credit for those wishing to attend college. It is intended for students who are interested in broadening their science background without placing the same emphasis on mathematics as would be done in the Physics Honors program. The course itself will be laboratory oriented and include the study of topics relating to matter, energy, space, and time as they are experienced in everyday life.

## **Physics Honors S185**

*Grades 11, 12*

*Year Course – 1 credit*

*Prerequisite: Biology Honors, Adv. Algebra and Trigonometry (concurrent enrollment permitted) or department recommendation*

This course is designed for students typically following an honors sequence. The focus of the program is intended to emphasize the development of critical thinking and mathematical skills, and those skills associated with effective laboratory investigation. These skills will be developed through studying the relationships of matter, energy, space, and time as observed in nature with strong emphasis on laboratory work.

## **Principles of Technology T245**

*Grades 11, 12*

*Year course – 1 credit*

*Prerequisite: Minimum grade of C in two science classes*

Students will study Physics principles and their applications. The topics of forces, vectors, fluids, heat, light, sound, mechanisms, optics, electricity, and electromagnetism are studied using robotics, hydraulics, pneumatics, holography, fiber optics, lasers, sensors, and motors. This course emphasizes the development of traditional Physics concepts and technical skills.

NOTE: This course may earn credit in Science. It may also fulfill an elective requirement in Applied Sciences.

**AP Physics C S189***Grades 11, 12**Year course – 1 credit**Prerequisite: Biology Honors and/or Physics Honors preferred, concurrent enrollment in Pre-Calculus or Calculus or department recommendation*

This course provides the opportunity to study topics normally covered in a first year college physics program. One semester is devoted to mechanics where students learn applications and problem-solving techniques in Kinematics, Newton's Laws of Motion, work, energy, and power, system of particles, linear momentum, rotation, oscillations, and gravitation.

The second semester is devoted to electricity and magnetism. Students learn to analyze and apply concepts in electrostatics, electric circuits, magnetostatics, and electromagnetism. The use of calculus in problem solving and in derivations is expected to increase as the course progresses.

AP students are encouraged to take the AP Physics examination in the spring for the potential earning of college credit and advanced college placement.

**AP Environmental Science S177***Grade 12**Year course – 1 credit**Prerequisite: Senior standing or department recommendation*

This course is designed to provide students with the scientific principles, concepts, and methodologies required to understand the inter-relationships of the natural world, to identify and analyze environmental problems both natural and human-made, and to evaluate the relative risks associated with these problems while examining alternative solutions for resolving and/or preventing them.

**Physiology S187***Grade 12**Year course – 1 credit**Prerequisite: Senior standing or department recommendation*

This course refines the basic concepts introduced in Biology and concentrates on the areas of human anatomy and physiology. Major emphasis is placed upon laboratory experiences and demonstrations with various organisms to investigate the structures and functions of the human body. Laboratory skills and relevant technical vocabulary associated with biological and medical professions are stressed.

**Astronomy and Space Science S191***Grades 11, 12**Year course – 1 credit**Prerequisite: Minimum grade of C in two Mathematics courses*

This is a course dealing with the study of observational astronomy, stars, planets, solar systems, and the human exploration of space. Topics to be studied include forces and gravity, molecular spectroscopy, optics and telescope design, planetary and solar system formation as well as stellar evolution. Basic qualitative and computer skills will be learned and reinforced through the computer lab component of this course.

**Astronomy & Space Science Honors S192***Grades 11, 12**Year course – 1 credit**Prerequisite: Concurrent enrollment in or successful completion of Chemistry and Geometry*

This course will introduce students to Astronomy and Space Science while emphasizing application of concepts of physics and mathematics. Topics to be studied are celestial coordinate systems; optics and telescope design; sun and solar system; stars and stellar evolution; galaxies and modern cosmology; and, the physics of space flight and exploration. Basic quantitative laboratory, computer, and observational techniques relevant to astronomy are included. Student use of computer and other technology is a major component of this course.

**Forensic Science S193***Grade 12**Year course – 1 credit**Prerequisite: Chemistry and Advanced Algebra with Trigonometry*

This course will investigate the history of forensic science, methods of investigating a crime scene, types of evidence, analysis of fingerprints, hair, fibers, drugs, glass, soil, and blood. In addition we will study agencies that offer forensics services, typical forensic labs and careers in forensic science. The class will rely heavily on labs, text readings of forensic journal articles and videos.

## **Geology S194**

*Grades 11, 12*

*Semester course – 0.5 credits*

*Prerequisite: Two years of science*

In this course the student will study rocks and minerals, plate tectonics, erosion, and the earth's history. The student will learn how the earth has changed since its creation and study the forces that caused those changes. This course is designed to be hands-on and includes extensive lab and computer work. Problem-solving strategies and the scientific method will be stressed.

## **Aviation Meteorology S195**

*Grade 11*

*Year course – 1 credit*

*Prerequisite: Department recommendation*

This course is designed to compliment Aviation Physics. It covers all aspects of Meteorology, including the atmosphere, energy transfer, circulation patterns, moisture, air pressure and storms. Also included are the special factors that impact aviation. This is weighted as an honors level course.

## **Aviation Physics S196**

*Grade 11*

*Year course – 1 credit*

*Prerequisite: Department recommendation*

A college level class similar to the Aviation Physics class offered at Lewis University. The course covers topics in mechanics, heat, electricity, magnetism, sound, and light. The course also encompasses special topics in aviation where students study the systems of an aircraft and become familiar with its instruments so that they can fly an aircraft according to the rules set forth by the FAA on a flight simulator. Students are expected to put in additional time on the flight simulator to finish the flight school and to complete all missions programmed in the simulator. All concepts taught in Physics Honors will be addressed in this class. This course is weighted as a Physics Honors class. Students who complete this class and wish to pursue a career in aviation at Lewis University can earn college credit for this class after successfully completing a placement test for it at Lewis University.