

Science Education**Dual Credit With College Of DuPage**

Students enrolled in the following course may apply to earn dual credit with COD. High school students who wish to take the course listed below for dual credit will receive college credit and a COD transcript regardless of whether or not they continue at College of DuPage. These credits may be transferable to other institutions.

Course Completed at NVHS, WVHS	Credit at COD
➤ Anatomy and Physiology: Course 4848	➤ Anatomy and Physiology 1500 Survey of Human Anatomy and Physiology (4 hrs. credit)
➤ Horticulture: Course 4806	➤ Horticulture 1100 Introduction to Horticulture (3 hrs. credit)
➤ Genetics Block (Frontier): Course 8847	➤ Biology 1120 Introduction to Genetics (3 hrs. credit)

Science

Ray Hanus, Department Chairperson - WVHS

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The science curriculum is designed to meet the needs of all of our students. The curriculum is structured into two distinct sequences based upon students' abilities and a group of electives for any student. Any four semesters of science, successfully completed, may be counted to fulfill the two-year requirement for graduation. The science department believes it is in the best interest of the student to experience two disciplines of science within his/her two-year science requirement. By completing both a life science and a physical science course, a student can have a better appreciation of the scope of science, be more prepared for specific content on standardized tests, and have a solid foundation for further science exploration.

Because honors and Advanced Placement (AP) course work is accelerated and more sophisticated, upper level work of high quality in a compacted time frame is demanded of students. The Science Department has developed recommendations for student success. These criteria are indicators of performance levels or standards for the honors or A.P. courses and are available from the Science Department.

Science Course Listings

Sequence I: College Prep Courses			
Course #	Title	Level	Prerequisite
4804	Earth Science	Yr. 10-12	1 year of science or by permission
4806	Horticulture	Yr. 10 -12	Biology or by permission
4807	Greenhouse Mgmt. & Floral Design	Yr. 11-12	Horticulture
4840	Astronomy: Exploring the Universe	Sem. 10 -12	None
4808	Chemistry/Physics	Yr. 10-12	Biology or by permission
4810	Biology	Yr. 9	None
4820	Chemistry	Yr. 10 -12	Biology and concurrent enrollment in Geometry
4832	Physics	Yr. 11-12	Biology, Chemistry, and Geometry
4840	Astronomy: Exploring the Universe	Sem. 10 -12	None
4844	Cosmic Journey	Yr. 10 -12	Geometry or taken concurrently w/teacher permission
4846	Human Genetics, Bioethics & Biotechnology	Yr. 10 -12	Biology and Chemistry or taken concurrently with teacher permission
4848	Anatomy & Physiology	Yr. 10 -12	Biology and Chemistry or concurrently with teacher recommendation

Sequence II: Accelerated & College Prep Courses			
Course #	Title	Level	Prerequisite
4812	Honors Biology	Yr. 9	Placement
4816	*AP Biology	Yr. 11 -12	Biology and Chemistry
4818	Honors Chemistry	Yr. 10 -11	Biology and Geometry
4822	*AP Chemistry	Yr. 11-12	Biology, Chemistry, Algebra II/Trig
4830	Honors Physics	Yr. 11-12	Biology, Chemistry, and Algebra II/Trig
4850	AP Environmental Science	Yr. 10-12	Biology, Chemistry, Algebra II/Trig
4852	AP Physics	Yr. 11-12	Physics & AP Calculus (AB or BC) concurrently

* This course meets for 1 and ½ periods (paired with lunch).

Science Course Descriptions

All Science courses are year-long, except Astronomy.

4804 Earth Science - *Grade 10-12. Prerequisite is one year of science or by permission.* This course represents an overview of the Earth. It engages each student in a laboratory study of topics in geology, including rocks and minerals, earthquakes and volcanoes, streams and glaciers. The topics of weather and climate are explored as well.

4806 Horticulture - *Grade 10-12. Prerequisite is Biology.* This is an ornamental plant based class with emphasis on botany, plant parts and processes, propagation, careers, and plant identification. Students are introduced to greenhouse management, landscape and floral design. The greenhouse and floral lab are used to give students a firsthand knowledge of concepts. This course is a college preparatory class for students interested in majoring in biological sciences or horticulture. This course is also a dual credit course with the College of DuPage. High school students, who wish, will receive college credit on a COD transcript regardless of whether or not they continue at COD. These credits may be transferable to other institutions. This course does not meet NCAA core approval.

4807 Greenhouse Management & Floral Design - *Grade 11-12. Prerequisite is Horticulture.* This course will stress greenhouse management, plant production, and floral design. Specific plant growth topics including, but not limited to, botany, plant identification, plant management, propagation and careers will be stressed. Extensive use of the lab facilities and the greenhouse will be used to demonstrate concepts and supply students with first hand knowledge of plant growth and management practices. The students will create a greenhouse design and management project.

4808 Chemistry/Physics - *Grade 10-12. Prerequisite is one year of science.* This course provides students with a solid foundation of physical science and the laboratory techniques used to test and support such knowledge. One semester is an introduction to the principles of chemistry; the other is an introduction to the principles of physics.

4810 Biology - *Grade 9.* This laboratory is the traditional biology course. It is organized and conducted to provide the average student with a sound and comprehensive understanding of biology. Strong emphasis is given to understanding fundamental biological processes and how they apply to our daily lives.

4812 Honors Biology - *Grade 9. Weighted grade.* Students in freshman Honors Biology learn biology concepts based on the National Science Standards through creative and critical thinking skills in a hands-on approach. The laboratory experiences emphasize biology as an investigative process based on inquiry. Creating hypotheses by studying the facts and devising an explanation for them is a crucial part of this curriculum. Teaching strategies enable students to learn science through a natural development process. Beginning with exploration and moving through invention to application, students build solid foundations in biological concepts and theories while developing higher-order thinking skills. Suggested recommendations.

4816 AP (Advanced Placement) Biology - *Grade 11-12. Suggested recommendations are Biology and Chemistry. Weighted grade.* This course is a college level laboratory course dealing with advanced topics in biology. There are twelve mandatory laboratory experiences dealing with such topics as diffusion, osmosis, enzyme catalysis, molecular biology, and genetics. Students may receive college credit in biology by qualifying on an examination administered by the College Entrance Examination Board at the end of the course.

4818 Honors Chemistry - *Grade 10-12. Weighted grade. Prerequisites are Biology and Geometry.* This course introduces students to the fundamental concepts and theories of chemistry. The pace and scope of the course are designed for the above average student. This laboratory course emphasizes problem-solving, analysis, critical thinking, and experimentation.

4820 Chemistry - *Grade 10-12. Prerequisite is Biology.* This course introduces the college bound student to basic chemical principles through lecture, laboratory and group work. The laboratory emphasizes the discovery of key concepts through the analysis of student generated data. An "A" or "B" in Algebra I or Geometry is strongly recommended.

4822 AP (Advanced Placement) Chemistry - *Grade 11-12. Prerequisites are Chemistry and Algebra II/ Trigonometry. Weighted grade.* Advanced Chemistry is a college level laboratory course dealing with advanced topics in inorganic chemistry. Students may receive college credit in Advanced Chemistry by qualifying on an examination administered by the College Entrance Examination Board at the conclusion of the course. This course is weighted and emphasizes problem solving and lab experience. It is a good preparation for chemistry, engineering and medical careers. Honors Chemistry is strongly recommended.

4830 Honors Physics - *Grade 11-12. Prerequisites are Biology, Chemistry. Algebra II/Trig. Weighted grade.* This course introduces students to the basic concepts and theories of physics. The pace and scope of this course are designed for the above average student with a sound understanding of algebra, geometry, and trigonometry. This course emphasizes problem-solving and experimentation. Honors Math Analysis is strongly recommended.

4832 Physics - *Grade 11-12. Prerequisites are Biology, Chemistry, Algebra, and Geometry.* Physics presents a practical overview of general classical and modern physics topics. In this introductory course the emphasis will be upon laboratory investigations leading to a firm grasp of conservation of momentum, energy and charge. The math requirement entails proficient use of algebra and plane geometry.

4840 Astronomy: Exploring the Universe - *Grade 10-12. Semester course.* This is an introductory course that focuses on observational astronomy. The planetarium is used in order for students to comprehend observational techniques and coordinates that help them observe the heavens. Seasonal stars and constellations, their mythologies, and constellation creation are the main focuses of this class.

4844 Cosmic Journey - *Grade 10-12. Prerequisite is geometry (may be taken concurrently).* Students begin their journey at the time of the Big Bang and explore the universe through the eyes of Galileo, Copernicus, Kepler, Newton and other great minds. As they journey into present times, they learn about the extinction of the dinosaurs, the solar system, galaxies, stars, black holes, and the laws that govern the universe. Many laboratory experiences and group projects, along with trips to the planetarium, will be used to reinforce the astronomical concepts learned in class. Each student will also construct his own refracting telescope. A field trip to the Museum of Science and Industry to explore the Henry Crown Space Center and the Omnimax Theatre are also included.

4846 Human Genetics, Bioethics, and Biotechnology - *Grade 10-12. Prerequisite is Chemistry (may be taken concurrently).* This college level course introduces students to the fundamental concepts of genetics. It is designed to acquaint students with not only the classical patterns of inheritance but also with the present day findings in molecular genetics. Laboratory experiments provide active participation in demonstrating and applying the concepts and theories of genetics and biotechnology. Present day bioethics issues in biotechnology are addressed.

8847 Genetics Block (Frontier) - *Grade 12.* This college level course introduces students to the concepts of heredity and the current use of such information. Topics included are classical and post-classical genetic transmission, the structure and function of the chromosome, chromosomal abnormalities, the chemical nature of DNA, biotechnology, gene expression, mutations, population genetics, and evolution. Special consideration is given to the ethics of societal use of genetic technology today. Students may apply to earn dual credit through COD.

4848 Anatomy and Physiology - *Grade 10-12. Prerequisite is Chemistry (may be taken concurrently).* This college level course introduces students to the fundamental concepts of human anatomy and physiology. Particular emphasis is placed on animal dissections to help the students learn how the human body functions. Students may apply to earn dual credit through COD.

4850 AP (Advanced Placement) Environmental Science - *Grade 11-12. Prerequisite is Chemistry and Algebra II/Trig. . Weighted grade.* The goals of the AP Environmental Science course are to provide students with the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world; to identify and analyze environmental problems both natural and man-made; to evaluate the relative risks associated with these problems; and to examine alternative solutions for resolving and/or preventing them. Environmental science is

interdisciplinary, embracing a wide variety of topics that include ecology, geology, history, sociology, economics, and chemistry. Field experiences may include a four-day trip to northern Wisconsin, and/or one-day trips to a local prairie, stream, and forest. There is a one-time fee associated with the experiences.

4852 AP (Advanced Placement) Physics - *Grade 11-12. Prerequisites are Physics and Calculus (may be taken concurrently).* Weighted grade. This calculus-based college style physics course is structured to provide a strong preparation in physics for those intending to major in engineering, mathematics, physics, astronomy, or medicine. Students may receive college credit in Advanced Physics by qualifying on an examination administered by the College Entrance Examination Board at the end of the course.