

SCIENCE

The Science department aims to develop scientifically literate students through the use of discussions, experiments, demonstrations, resource people, and visitations to scientific institutions. Students must acquire the necessary values, attitudes, and skills that will enable them to be objective in their approach to the many problems they will encounter in a rapidly changing, scientifically oriented society. To best meet these goals and prepare students to succeed on the Connecticut Academic Performance Test (CAPT), the department recommends that all students enroll in Science in Grades 9, 10, and 11. The recommended sequence is Earth Science in grade 9, Biology in grade 10, and Chemistry, Physics, or a Science elective in grades 11 and/or 12. Students with sufficient credits to be classified as a tenth grader will be placed in Biology. Success in science on the Connecticut Academic Performance Test (or on the District Performance Standard) is a graduation requirement. The Science component of the CAPT encompasses concepts, applications, and experimentation from three major areas: Earth Science, Life Science and Physical Science. The test, taken in tenth grade, assesses Science education from kindergarten through tenth grade. Graduation requirements include three credits in Science (one in introductory Biology; one in Earth Science, Chemistry, or Physics; and one Science elective).

SCIENCE COURSE DESCRIPTIONS

EARTH SCIENCE - PRACTICAL (7111)
Full Year Credit 1.00 Weight 1.00

Prerequisites: This course is open to students in Grade 9 or 10.

Description: This course represents a basic understanding of earth science concepts and processes in a structured, small class setting. Topics for discussion and laboratory investigation include geology, rocks and minerals, geologic time, energy and the environment, and weather. Attention will also be given to preparation for the CAPT, including implementation of the state embedded labs and STS activities.

EARTH SCIENCE - GENERAL (7211)
Full Year Credit 1.00 Weight 1.02

Prerequisites: This course is open to students in Grade 9 or 10.

Description: Topics for discussion and laboratory investigation will include geology, geologic time, rocks and minerals, plate tectonics and earthquakes, meteorology, energy and the environment. Attention will also be given to preparation for the CAPT, including implementation of the state embedded labs and STS activities.

EARTH SCIENCE - COLLEGE (7311)
Full Year Credit 1.00 Weight 1.04

Prerequisites: This course is open to students in Grade 9 or 10.

Description: Topics for discussion and laboratory investigation will include geology, geologic time, rocks and minerals, plate tectonics and earthquakes, meteorology, energy, and the environment. Attention will also be given to preparation for the CAPT, including implementation of the state embedded labs and STS activities.

EARTH SCIENCE - HONORS (7411)
Full Year Credit 1.00 Weight 1.06

Prerequisites: This course is open to students in Grade 9 who have earned a recommended grade of 85 or higher in Level I Science in Grade 8.

Description: In this course, students will use scientific inquiry, literacy, and numeracy while investigating and discussing topics in the earth sciences. Geology, meteorology, oceanography, and environmental topics will be covered. Attention will also be given to preparation for the CAPT, including implementation of the state embedded labs and STS activities.

BIOLOGY - PRACTICAL (7121)
Full Year Credit 1.00 Weight 1.00

Prerequisites: This course is open to students in Grades 10, 11, and 12.

Description: This course presents a basic understanding of biological concepts and processes in a structured, small class setting. Topics for discussion and laboratory investigation will include scientific skills and processes, cell study, evolution, plant and animal structures, heredity, and ecology. This course meets the biology requirement for graduation. Attention will also be given to final preparation for the CAPT, including implementation of the state embedded labs and STS activities.

BIOLOGY - GENERAL (7221)
Full Year Credit 1.00 Weight 1.02

Prerequisites: This course is open to students in Grades 10, 11, and 12.

Description: This course is designed to familiarize students with scientific processes and skills and biological concepts needed for a scientifically literate society. The topics for discussion and laboratory investigation include scientific method and processes, cell structure and function, cell reproduction, genetics, evolution, the six kingdoms of life, and ecology. This course meets the biology requirement for graduation. Attention will also be given to final preparation for the CAPT, including implementation of the state embedded labs and STS activities.

BIOLOGY - COLLEGE (7321)

Full Year Credit 1.00 Weight 1.04

Prerequisites: This course is open to students in Grades 10, 11, and 12.Description: This course is designed to meet the needs of students planning on attending college and includes the depth of curriculum and laboratory experience needed to prepare these students. Topics for discussion and laboratory experience include scientific method and processes, cell anatomy and physiology, genetics, evolution, microbiology, zoology, botany, and ecology. This course meets the biology requirement for graduation. Attention will also be given to final preparation for the CAPT, including implementation of the state embedded labs and STS activities.**BIOLOGY - HONORS (7421)**

Full Year Credit 1.00 Weight 1.06

Prerequisites: This course is open to students in Grades 10, 11, and 12 who have successfully completed the Earth Science - Honors course or who have earned a recommended grade of 85 or better in Earth Science - College.Description: Students selecting this course should understand that the workload (classwork and homework) is substantially more demanding than the College level course. Greater emphasis is placed on student centered activities, research, and independent exploration of course topics. Students will assume a greater degree of responsibility for learning through independent work, critical thinking, and completion of out-of-class assignments. Topics for discussion and laboratory investigation include scientific method and processes, cell anatomy and physiology, genetics, evolution, microbiology, zoology, botany, and ecology. This course meets the biology requirement for graduation. Attention will also be given to final preparation for the CAPT, including implementation of the state embedded labs and STS activities.**ADVANCED PLACEMENT BIOLOGY (7521)**

Full Year Credit 1.50 Weight 1.08

Prerequisites: This course is open to students in Grades 11 and 12 who have successfully completed Biology - Honors or completed Biology - College with a grade of 85 or better. Since chemistry is an important component of this course, it is also highly recommended that students have also successfully completed a year of Chemistry.Description: The A.P. Biology course is designed to model an introductory college biology course, with the curriculum content covering the same broad spectrum of information. The curriculum includes extensive lab work which supplements class discussions and lectures. Students electing A.P. Biology should have a genuine interest in biology, realize the work load is correlated to 1.5 credits of an honors level course, and recognize this course will require a consistent effort throughout the year. Topics for discussion and laboratory investigation will include cell anatomy and physiology, genetics, growth and development, microbiology, zoology, botany, and ecology. Students will be required to take (and pay for) the Advanced Placement Examination in the spring.**PRINCIPLES OF SCIENCE - PRACTICAL (7131)**

Full Year Credit 1.00 Weight 1.00

Prerequisites: This course is open to students in Grades 11 and 12 or with special permission of Science department head.Description: This course presents a basic understanding of physical science concepts and processes in a structured, small class setting. Topics for discussion and laboratory investigation will include properties of matter, atoms, chemical changes, force and motion, simple machines and mechanical advantage, energy and heat, waves and sound, and light and the effects of lenses and mirrors. Emphasis will be placed on a descriptive approach to scientific principles encountered in everyday life. This course meets the physical science or the elective science requirement for graduation.**CHEMISTRY - GENERAL (7231)**

Full Year Credit 1.00 Weight 1.02

Prerequisites: This course is open to students in Grades 10, 11, and 12 or with special permission of Science department head.Description: This course introduces students to chemical laws and processes, simple problem solving, equation writing, and the chemistry of everyday life. Topics will include: fundamentals of matter and energy; atomic theory; chemical bonding; formulas; gas laws; equations; solutions; acids and bases; and chemistry as it applies to the home, the environment, and industry. Laboratory experiences enhance the classroom discussions.**CHEMISTRY - COLLEGE (7331)**

Full Year Credit 1.00 Weight 1.04

Prerequisites: This course is open to students in Grades 10, 11, and 12 or with special permission of Science department head. Prior successful completion of Algebra I - College is required.Description: This course introduces students to chemical laws, logical and sequential thinking, problem solving, and some practical applications of chemistry. Topics will include: measurement; matter and energy; atomic structure; chemical bonding; formula and equation writing and mathematical relationships; gas laws; solutions; and acids and bases. Laboratory experiences enhance classroom discussions.**CHEMISTRY - HONORS (7431)**

Full Year Credit 1.00 Weight 1.06

Prerequisites: This course is open to students in Grades 10, 11, and 12. A grade of 85 or higher in Algebra I - College is recommended.Description: This honors course is designed for students who plan to further their education in the sciences. The study of the properties of elements and compounds is approached at a more advanced and detailed level than in the College level course. Theory and mathematical application are emphasized in areas of acids and bases, gas behavior, and solutions. Laboratory experiences enhance the classroom discussions.

ADVANCED PLACEMENT CHEMISTRY (7531)

Full Year Credit 1.50 Weight 1.08

Prerequisites: This course is open to students in Grades 11 and 12 who have successfully completed the Chemistry - College or the Chemistry - Honors course. A grade of 85 or higher in Chemistry - College or Honors is recommended. It is preferred that students have successfully completed the Chemistry - Honors course.

Description: The Advanced Placement Chemistry course is designed for students intending to major in the sciences in college. The depth and breadth of this course is similar to that of freshman college chemistry with emphasis on advanced problem solving and critical thinking. Topics for discussion include atomic theory, chemical bonding, gas laws, states of matter, reaction types, acid-base theory, stoichiometry, kinetics, thermodynamics, solutions, oxidation-reduction reactions, and equilibrium. Students will be required to take (and pay for) the Advanced Placement Examination in the spring.

PHYSICAL SCIENCE - GENERAL (7241)

Full Year Credit 1.00 Weight 1.02

Prerequisites: This course is open to students in Grades 10, 11, and 12 or with special permission of Science department head. Prior successful completion of Basic Algebra I or Applied Math-Algebra Topics and Applied Math-Geometry Topics is required.

Description: Topics for discussion and laboratory investigation will include velocity and acceleration, force, work, simple machines, power, forms of energy, states of matter, waves, sound, light, and electrical energy. Applications in everyday life will be stressed. This course meets the physical science or the elective science requirement for graduation.

PHYSICS - COLLEGE (7341)

Full Year Credit 1.00 Weight 1.04

Prerequisites: This course is open to students in Grades 10, 11, and 12 or with special permission of Science department head. Prior successful completion of Algebra I - College and Geometry - College is required.

Description: Topics for discussion and laboratory investigation will include velocity and acceleration, forces, two-dimensional motion, momentum, energy, heat, waves, sound, properties of light, electrostatics, and electromagnetism.

PHYSICS - HONORS (7441)

Full Year Credit 1.00 Weight 1.06

Prerequisites: This course is open to students in Grades 10, 11, and 12. A grade of 85 or higher in Algebra I - College and Geometry - College is recommended.

Description: This honors course is designed for students who plan to further their education in the sciences. Topics for discussion and laboratory investigation will include velocity and acceleration, forces, two-dimensional motion, momentum, energy, heat, waves, sound, properties of light, electrostatics, and electromagnetism. Some selected contemporary topics related to recent advances in physics may also be discussed.

ADVANCED PLACEMENT PHYSICS B (7541)

Full Year Credit 1.50 Weight 1.08

Prerequisites: This course is open to students in Grades 11 and 12 who have successfully completed the Physics - College or Honors course. A grade of 85 or higher in Physics - College or Honors is recommended. It is preferred that students have successfully completed the

Physics - Honors course.

Description: The Advanced Placement Physics B course is designed for students intending to major in the sciences in college. Topics for discussion and laboratory investigation will include kinematics, Newton's laws of motion, rotational dynamics, conservation laws in classical mechanics, kinetic theory and thermodynamics, electrostatics, electric circuits, magnetism, waves and optics, and modern physics. Students will be required to take (and pay for) the Advanced Placement Examination in the spring.

Note: Since this course is algebra-based, some select colleges may not accept this for exemption from their introductory freshman offering.

ANATOMY AND PHYSIOLOGY (7335)

Full Year Credit 1.00 Weight 1.04

Prerequisites: This course is open to students in Grades 11 and 12 who have successfully completed Biology - Honors or Biology - College.

Description: This course is designed for college bound students who plan to further their studies in the biological sciences. Topics will include muscle physiology, the skeletal system, the nervous system, hematology, lymphatic systems, tissues, somatic and special senses, circulation, respiration, excretion, digestion, reproduction, and endocrine secretions. Highly motivated students with good study habits will find this course challenging. This course meets the Science elective requirement for graduation.

MARINE SCIENCE (7338)

One Semester Credit 0.50 Weight 1.04

Prerequisites: This course is open to students in Grades 11 and 12. Prior successful completion of Biology - General, College, or Honors is required.

Description: This course is designed for students who wish to further their understanding of oceanography and marine biology. Topics include the physical properties of seawater, ocean currents, density problems, tides, marine organisms and the ecosystems of coral reefs, the intertidal zone, and the deep sea. Special emphasis is placed on man's influence within these marine habitats and possible solutions to current global problems. Two major reports are required. Students should be prepared for regular homework assignments, lab reports, and tests that are all on a college preparatory level. This course does not meet the physical or the biological science requirement for graduation, but will be applied toward the Science elective requirement for graduation.

ENVIRONMENTAL SCIENCE (7339)

One Semester Credit 0.50 Weight 1.04

Prerequisites: This course is open to students in Grades 11 and 12. Prior successful completion of Biology - General, College, or Honors is required.

Description: This course is designed for students who wish to further their understanding of environmental topics. Topics will include ecology, environmental pollution, energy sources, natural cycles, and loss of biodiversity. Global change topics (ozone depletion, greenhouse effect, deforestation, etc.) and problems specific to Vernon will be discussed. Some knowledge of computers and scientific testing procedures is helpful but not necessary. One major report will be required. Students should be prepared for regular homework assignments, lab reports, and tests that are all on a college preparatory level. This course does not meet the physical or biological science requirement for graduation, but will be applied toward the Science elective requirement for graduation.

ALLIED HEALTH I (7336)

One semester Credit 0.50 Weight 1.04

(Includes shadowing experience time)

Prerequisites: This course is open to students in Grade 11. Prior successful completion of Algebra I and Biology - General, College, or Honors is required. An application and interview is required for acceptance into this program.

Description: Allied Health I is designed for students are considering a career in one of the allied health fields such as surgical technology, occupational therapy, or respiratory care. Students will participate in shadowing experiences at Rockville General Hospital in the following areas: surgical technology, respiratory care, diagnostic imaging, bioengineering, nutrition, physical therapy, occupational therapy, and the BirthPlace. Field trips to area medical facilities, guest speakers, and classwork will highlight various opportunities in the medical fields. This course will be applied toward the elective Science requirement for graduation.

ALLIED HEALTH II (7337)

Full Year Credit 1.00 Weight 1.04

Prerequisites: This course is open to students in Grade 12. Prior successful completion of Allied Health I is required.

Description: Allied Health II is a component of the Tech Prep program cooperatively developed by the Rockville High School Science Department, Rockville General Hospital, Manchester Community College, and Vernon Regional Adult Education. This laboratory oriented program utilizes a systems approach to study human anatomy and physiology. The clinical component will permit students to select several allied health specialties from their junior year experience for an in depth shadowing experience at Rockville General Hospital and area medical facilities. College credit at Manchester Community College is available upon successful completion of this course. This course meets the elective Science requirement for graduation.

INDEPENDENT STUDY IN SCIENCE

Credit and weight by Arrangement

Prerequisites: Approval of Housemaster, Science staff, and Guidance Counselor is required.

Description: Independent study is offered to students who have successfully completed other Science classes and who wish to continue their study *in a specific area where there is no advanced offering*. The student will write his or her own plan of activities as outlined in the Science department's guidelines.