

SCIENCE COURSES AT CASTLE HIGH SCHOOL

BIOLOGY I (L) 273/274

GRADE 9

2 semesters

Biology I (L) is structured for the majority of students. Biology I is a beginning course designed to study living organisms while providing a broad introduction to the numerous disciplines of biology. General concepts about the cell, genetics, evolution, and ecology are studied and applied in the laboratory.

BIOLOGY I/A (L) 273A/274A

GRADE 9

2 semesters

Biology I/A (L) is an advanced course that is structured with a challenging curriculum covering the regular course work, plus additional materials and laboratories designed for advanced students to study organisms and the environment. Concepts about the cell, genetics, evolution, ecology, and organisms are studied in greater depth than is covered in the regular biology class.

BIOLOGY I/B (L) 273B/274B

GRADE 9-10

2 semesters

Biology I/B (L) will cover the same basic principles as Biology I (L) including concepts about the cell, genetics, evolution and ecology. Concepts are studied with a hands-on approach while applying them in the laboratory.

BIOLOGY II (L) 277/278

GRADE 10-12

2 semesters

Biology II (L) is a continuation of Biology I and is designed to cover topics that will further solidify the main ideas of biological science. Topics may include microbiology, human anatomy and physiology, human genetics, and ecology.

Prerequisite: Biology I (L) or higher

ICP (Integrated Chemistry-Physics T) (L) 289B/290B

GRADE 11

2 semesters

Integrated Chemistry-Physics T (L) is designed to give a broad introduction to the many areas of chemistry and physics that impacts life. Junior level students take two semesters of chemistry-physics integrated content. Concepts are studied with a hands-on approach while applying them in the laboratory. Integrated Chemistry-Physics T (L) is for students who have completed Biology I/B (L). Integrated Chemistry-Physics T (L) qualifies as a quantitative reasoning course.

Prerequisite: Biology I/B (L) or higher and Algebra I T4 or higher

PHYS-CHEM (Integrated Chemistry-Physics) (L) 289/290

GRADE 11 (or 10 with recommendation)

2 semesters

Integrated Chemistry-Physics (L) is for college bound students preparing for non science-based majors or minors in college. This course is designed to give a broad introduction to the many areas of chemistry and physics that impacts life. Students take one semester of chemistry content and one semester of physics content. The course is also designed for sophomore and junior level students needing to reinforce the science and math skills required in either Chemistry I or

Physics I (this course may not be taken if a student has already completed Chemistry I or Physics I). Integrated Chemistry-Physics (L) qualifies as a quantitative reasoning course.

Prerequisites for Juniors: Biology I (L) and Algebra I with a grade of "B" or higher
Prerequisite for Sophomores: Biology I (L) and concurrent with Algebra II or by teacher recommendation

CHEMISTRY I (L) 281/282 GRADES 10-12	2 semesters
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Chemistry I (L) is for college bound students preparing for science-based majors or minors in college. Topics include nomenclature, atomic theory, electron distribution, periodic table, bonding, mole calculations, equations, properties of matter, solution chemistry, and acid-base chemistry. The laboratory portion of the class introduces techniques, equipment, and relation to theory. Chemistry I (L) qualifies as a quantitative reasoning course.

Prerequisite: Biology I (L) and Algebra I with a grade of "B" or higher

PHYSICS I (L) 291/292 GRADES 10-12	2 semesters
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Physics I (L) is for college bound students preparing for science/math-based majors or minors in college. Topics include vectors, forces, mechanics, energy, waves, electricity, and magnetism. The laboratory portion of the class introduces techniques, equipment, and relation to theory. Physics I (L) qualifies as a quantitative reasoning course.

Prerequisite: Biology I (L), Geometry, and taken or currently enrolled in Algebra II (Phys-Chem or Chemistry I is recommended)

ENVIRONMENTAL SCIENCE: ADVANCED PLACEMENT (L) 250/251 GRADE 10-12	2 semesters
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The goal of the AP Environmental Science course is 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 human-made, to evaluate the relative risks associated with these problems, and to examine alternative solutions for resolving or preventing them. This course is designed to be equivalent to a course in environmental science at the university level. It is a lab based course with a minimum of 25% of the course doing environmental experiments.

Prerequisite: Biology I, and at least concurrently enrolled in Algebra II and Phys/Chem.

ANATOMY & PHYSIOLOGY (L) Dual Credit 263/264

GRADES 11-12**2 semesters**

Anatomy & Physiology (L) is a two semesters, college bound elective course designed to provide information about the structure and function of the human body in lecture and laboratory settings. It is especially designed for students who are pursuing degrees/careers in science/health fields. Topics include medical terminology, the physical basis of life and the systems of the human body. This course is also available as a CAP course (BIO 105) through USI for college credit.

*Prerequisites: Biology I (L) and Phys-Chem (Integrated Chemistry-Physics) (L)
(Chemistry I and Physics I are recommended)*

ADV SCI ST: GENETICS (L) Dual Credit (must take both genetics and zoology) 266
GRADES 11-12 **1 semester**

Advanced Science Special Topics: Genetics (L) is a one semester, college bound elective course designed to provide information about genetics (especially human genetics) and heredity in lecture and laboratory settings. Topics covered include cell division, Mendelian genetics, exceptions to Mendelian genetics, genetic expression and variation, DNA structure and analysis and biotechnology. Students often pair this course with ADV SCI ST: Zoology (L).

*Prerequisites: Biology I (L) and Phys-Chem (Integrated Chemistry-Physics) (L)
(Chemistry I is recommended)*

ADV SCI ST: ZOOLOGY (L) Dual Credit (must take both genetics and zoology) 265
GRADES 11-12 **1 semester**

Advanced Science Special Topics: Zoology (L) is a one semester, college bound elective course designed to provide information about animals in lecture and laboratory settings. Students often pair this course with ADV SCI ST: Genetics (L). Topics include classification, conservation, ecology, evolution, and animal diversity.

*Prerequisites: Biology I (L) and Phys-Chem (Integrated Chemistry-Physics) (L)
(Chemistry I is recommended)*

CHEMISTRY II (Inorganic & Physical Chemistry) (L) Dual Credit 283/284
GRADE 11-12 **2 semesters**

Chemistry II (L) is a two-semester, college bound elective course designed to provide in-depth information about general chemistry, specifically inorganic and physical chemistry. It is especially designed for students who are pursuing degrees/careers in science fields. This course and associated laboratory helps students to attain the depth of understanding of fundamentals and a reasonable competence in dealing with chemical problems as might be expected in college level courses. Topics include general chemistry (all topics from Chemistry I), bonding, kinetics, equilibria, and thermodynamics. Some advanced topics may not be included to insure adequate time for fundamentals. Chemistry II (L) qualifies as a quantitative reasoning course. This course is also available as a CAP course (CHEM 107) through USI for college credit.

Prerequisite: Chemistry I (L), and Geometry (Algebra II is recommended)

ADV SCI ST: ORGANIC & BIOCHEMISTRY (L) 298/299

GRADE 11-12**2 semesters**

Advanced Science Special Topics: Organic and Biochemistry (L) is a two-semester, college bound elective course designed to provide an introduction to organic chemistry and biochemistry in lecture and laboratory settings. It is especially designed for students who are pursuing degrees/careers in science/health fields. Topics include organic molecules (saturated/unsaturated hydrocarbons, functional groups) and biomolecules (carbohydrates, lipids, proteins, nucleic acids).

Prerequisites: Biology I (L), Chemistry I (L) with a grade of "B" or higher.

CHEMISTRY: ADVANCED PLACEMENT (L) 285/286**GRADE 11-12****2 semesters**

Chemistry: Advanced Placement (L) is an accelerated course designed to review and extend the concepts introduced in Chemistry I. It is comparable to a course for science majors in freshman college chemistry. This course is structured around the six big ideas articulated in the AP Chemistry curriculum framework with an emphasis on science practices as provided by the College Entrance Examination Board. A minimum of 25% of student contact time will be spent doing hands-on laboratory activities which emphasize guided inquiry and analysis of data. Chemistry: Advanced Placement (L) qualifies as a quantitative reasoning course.

*Prerequisites: Algebra II, Chemistry I (L) with a grade of "B" or higher, and **consent of the instructor***

PHYSICS 1 ALGEBRA BASED: ADVANCED PLACEMENT (L) 295/296**GRADE 11-12****2 semesters**

Physics 1 Algebra Based: Advanced Placement (L) is equivalent to a first-semester college course in algebra-based physics. The course covers Newtonian mechanics (including rotational dynamics and angular momentum); work, energy, and power; mechanical waves and sound. It will also introduce electric circuits. A comprehensive description of this course can be found on the College Board AP Central Course Description web page at:

<http://apcentral.collegeboard.com/apc/public/courses/descriptions/index.html>

Physics 1 Algebra Based: Advanced Placement (L) qualifies as a quantitative reasoning course.

Prerequisite: Biology I (L), Geometry, and taken or currently enrolled in Algebra II (Phys-Chem or Chemistry I is recommended)

PHYSICS 2 C: ADVANCED PLACEMENT (L) 3088-1/3088-2**GRADE 12****2 semesters**

AP Physics C is a course based on the content established and copyrighted by the College Board. The course is not intended to be used as a dual credit course. There are two AP Physics C courses, Physics C: Mechanics, and Physics C: Electricity and Magnetism. AP Physics C: Mechanics provides instruction in each of the following six content areas: kinematics; Newton's laws of motion; work, energy, and power; systems of particles and linear momentum; circular motion and rotation; and oscillations and gravitation. AP Physics C: Electricity and Magnetism provides instruction in each of the following five content areas: electrostatics; conductors, capacitors, and dielectrics; electric circuits; magnetic fields; and electromagnetism. •

Recommended Grade Level: 12 • Recommended Prerequisite: Physics I, Calculus (can be taken concurrently) • Credits: 2 semester course, 1 credit per semester • Counts as a Science Course

for all diplomas • Counts as an Elective for all diplomas • Qualifies as a quantitative reasoning course

Prerequisites: Physics I (L) or Physics I Algebra Based: AP (L)

BIOLOGY: ADVANCED PLACEMENT (L) 279/280

GRADES 11- 12

2 semesters

Biology: Advanced Placement (L) aims to provide students with the conceptual framework, factual knowledge, and analytical skills necessary to deal critically with the rapidly changing science of biology. The Biology AP course is designed to be the equivalent of a college introductory biology course usually taken by biology majors during their first year. Biology: Advanced Placement (L) qualifies as a quantitative reasoning course.

*Prerequisites: Biology I (L), Chemistry I (L), an overall G.P.A. of 3.0, and **consent of the instructor***

ADV SCI ST: FORENSIC SCIENCE (L) 268-269

GRADES 11-12

2 semesters

Advanced Science Special Topics: Forensic Science (L) is a two semester, college bound elective course designed to teach students how to apply science to the law. Students will take the knowledge and technology of different areas of science (chemistry, anatomy, physiology, biology, toxicology and others) and see how it is used to define and enforce the laws of our country. This is a lab-oriented class that requires self-motivation. Student will study the following topics: processing the crime scene, collecting physical evidence, physical properties of gas and soil, organic and inorganic analysis, hairs, fibers and paint, drugs and toxicology, arson and explosion, serology, fingerprinting, DNA fingerprinting, tool marks and impressions, and handwriting and voice examination.

*Prerequisites: Biology I (L) and Phys-Chem (Integrated Chemistry-Physics) (L)
(Chemistry I is recommended)*

ADV SCI ST: PRACTICUM IN MEDICINE (L) 270

GRADE 12

1 semester

Advanced Science Special Topics: Practicum in Medicine exposes participants to a wide range of health care professions. Participating students are able to witness firsthand the duties and practice of physicians, nurses, medical support services, administration, and other health care professionals. Participating students will attend regular Castle High School classes in the morning during their assigned practicum semester. Monday, Wednesday, and Thursday of each scheduled week, they will leave Castle in the afternoon and report to the location of their assigned rotation. Tuesday and Friday of each scheduled week, they will be enrolled in an anatomy and physiology course and will be expected to complete all requirements for this course. Interested applicants should fill out an application and submit an essay describing their interest in the field of medicine.

Prerequisites: Biology I (L), Integrated Chemistry-Physics (L), an overall G.P.A. of 3.0, and consent of the instructor/clinical provider (Chemistry I & Physics I are recommended)

Must be concurrently enrolled in anatomy and physiology