SCIENCE

Biology* **Credit: 1.00 Year F**

Biology examines life as a set of interacting systems: from atoms and biological molecules to cells, organisms and ecosystems. The program is designed to introduce to students the chemistry of life, the utilization of energy and energy transfer, the workings of the cell, cell division, genetics, and the fundamentals of plant and animal biology. Students explore techniques and recent trends in biotechnology and discuss the implications and ethics of such. Participation in lab activities provides first-hand experience collecting and interpreting data. The course emphasizes the IB Approaches to Learning Skills, practices the application of critical-thinking, performs scientific measurements, and emphasizes the interpretation of data through graphing. Inquiry based activities along with traditional learning approaches help prepare students for future course work in the sciences. Honors Biology requires more in-depth discussion, analysis and outside readings.

Principles of Biomedical Science Credit 1.00 Year F

In the introductory course of PLTW Biomedical Science program, Mercy High School students explore concepts of biology and medicine to determine factors that led to the death of a fictional person. While investigating the case, students examine autopsy reports, investigate medical history, and explore medical treatments that might have prolonged the person's life. The activities and projects introduce students to human physiology, basic biology, medicine, and research processes while allowing them to design their own experiments to solve problems. *Prerequisite: Admission to Project Lead the Way Biomedical Science.*

Physical Science Credit: 1.00 Year SO

Physical Science is a course where students study the relationships between matter and energy. This laboratory-based course intends to teach thinking skills and foster student self-confidence in the learning process and the ability to work closely with others. The goal of the course is twofold: to teach students about their world through basic science topics in chemistry and physics and to prepare students for more advanced science courses. The first portion of the year is an introduction to chemistry; students study topics including atoms, the Periodic Table, compounds, and chemical reactions. The second part of the year students learn about basic physics topics, including motion, force, waves, and energy. Because this is a content-oriented and skill-building course, topics are covered with a variety of approaches, including hands-on laboratory work, independent learning, group activities, inquiry based and traditional learning. Also included are problem- solving skills, study and test taking skills, decision-making, and critical thinking. *Prerequisites: Teacher recommendation and department approval.*

* Honors section offered

Introduction to Physics (Honors) Credit 1.00 Year SO

Introduction to Physics is an Honors course for sophomores. Students are introduced to physics through discovery, understanding, and application. Students are building an understanding through exploration, developing comprehension through demonstration and thought-provoking questioning, and applying skills and knowledge through a variety of inquiry-based activities and problem-solving. Laboratory work and activities are an essential part of the course. Topics in this Algebra based study include: mechanics, Newton's Law of Motion, energy, work, power, waves, light, sound, electricity, and introductory topics in modern physics. *Prerequisites: Teacher recommendation and department approval.*

Human Body Systems Credit: 1.00 Year SO

Students examine the interactions of human body systems as they explore identity, power, movement, protection, and homeostasis. Exploring science in action, students build organs and tissues on a skeletal mannequin; use data acquisition software to monitor body functions such as muscle movement, reflex and voluntary action, and respiration; and take on the roles of biomedical professionals to solve real-world medical cases. *Prerequisite: Principles of Biomedical Science.*

Chemistry* Credit: 1.00 Year J/S

Chemistry is a science course that studies matter and the changes that matter may undergo. Students are directed to examine the intricacies of chemical composition and reactions while contemplating the balance and order that exist in the universe. Laboratory experiments and discussions provide opportunities to develop skills and techniques to reinforce classroom topics and prepare students for advanced topics in chemistry. Problem-solving plays an essential role in this course, providing students with the opportunity to apply algebraic concepts which they have learned to further investigate the chemical world. Honors Chemistry requires more advanced problem-solving techniques along with graphical and data analysis abilities. *Prerequisites: Biology, Algebra I, a Physical Science, teacher recommendation, and department approval.*

Environmental Science Credit: 1.00 Year J/S

Environmental Science is designed to expose the student to the interrelationships between living and non-living components of the environment. The students will explore biological, chemical and physical properties associated with ecosystems and apply these principles to laboratory exploration. The course will explore alternate forms of energy, environmental pollutants and conservation while the political, social and ethical issues related to these topics will be discussed. Lab work will be a component of this course as well as community projects and outside readings. Prerequisites: Biology, a Physical Science, teacher recommendation and department approval.

* Honors section offered

Medical Interventions Credit: 1.00 Year J

Students follow the life of a fictitious family as they investigate how to prevent, diagnose, and treat disease. Students explore how to detect and fight infection; screen and evaluate the code in human DNA; evaluate cancer and prevail when the organs of the body begin to fail. Through real-world cases, students are exposed to a range of interventions related to immunology, surgery, genetics, pharmacology, medical devices, and diagnostics. *Prerequisite: Human Body Systems.*

Biology II (Honors) Credit: 1.00 Year S

Biology II (Honors) presents to the students a greater depth and understanding of major life science concepts. Designed to build upon the basic fundamentals of Biology, Biology II explores in detail the biochemistry of the cell, the transfer and utilization of energy, cell communication, DNA and RNA, and the mechanisms behind variation. Emphasis is placed on genetics and biotechnology along with the ethical implications associated with this advancing knowledge. Independent laboratory work, formal laboratory reports, critical-thinking exercises, and outside readings are important components to the course. Students enhance their understanding of mammalian anatomy and physiology by performing a sheep heart dissection in the spring. *Prerequisites: Biology and Chemistry with a minimum of a B- average and a cumulative GPA of 3.0, teacher recommendation, and department approval.*

Physics (Honors) Credit: 1.00 Year S

Physics (Honors) is a one-year college preparatory laboratory course designed for students who plan to pursue science or engineering fields in college, but open to all qualified students. Physics, the study of motion, energy, and forces, is quantitative in character and is closely linked with Mathematics. Considerable attention is given to problem-solving utilizing Trigonometry and Advanced Algebra. Laboratory experiments and reports are completed where students observe and analyze Physics in action. Topics include mechanics, kinematics, work and energy, waves, electromagnetic waves, electricity, magnetism, along with the fundamental topics of modern physics. *Prerequisites: Successful completion of Algebra II or higher, presently enrolled in Introductory Pre-calculus, Pre-calculus (H), or AP Calculus, teacher recommendation, and department approval.*

AP Biology Credit: 1.00 Year S

AP Biology enables students to pursue college-level biological studies while still in high school. The content of the course is designed to spend less time on factual recall and more time on inquiry-based learning of essential concepts as identified by the College Board. To foster a deeper level of learning students will be guided in their development of advanced inquiry and reasoning skills along with techniques in collecting data, data analysis and mathematical applications. Independent outside readings, laboratory reports and research will be assigned and the student should expect additional scheduled times during the school year where they will be asked to meet with the instructor for additional

support and lab time. The AP Biology course is equivalent to a two-semester college introductory course in biology and will include a sheep heart dissection in the spring to enhance student understanding of mammalian anatomy and physiology with regards to the circulatory system. The AP Biology Exam is offered in the late spring and is an expectation of the course. *Prerequisites: Biology and Chemistry with a minimum of a B average and a cumulative GPA of 3.0, teacher recommendation, and department approval.*

Biomedical Innovation Credit: 1.00 Year S

In the final course of the PLTW Biomedical Science sequence, students build on the knowledge and skills gained from previous courses to design innovative solutions for the most pressing health challenges of the 21st century. Students address topics ranging from public health and biomedical engineering to clinical medicine and physiology. They have the opportunity to work on an independent project with a mentor or advisor from a university, medical facility, or research institution. *Prerequisites: Medical Interventions.*