Science Division

High School Courses

BARD029 **Introduction to Science**
This course provides a solid conceptual foundation for physical and life sciences through problem solving, demonstrations, and hands-on laboratory work. Students learn to understand the role of empirical data in establishing scientific knowledge and develop skills through experimental design. In addition to empirical evidence, science involves skepticism and rational arguments: students demonstrate the critical thinking, skepticism and logical deduction inherent in the practice of the science. Students also investigate several paradigm examples of the fundamental conceptual models in science which underlie our current understanding of the natural world.

BARD032 **Physics**
This one-semester course presents an introduction to physics. While this course will focus on a conceptual understanding of the material, students will also be expected to analyze ideas within a mathematical framework consistent with the skills developed in their current math class. Critical thinking will be fostered throughout the course through the application of the scientific method. Topics discussed this semester will include motion and kinematics, forces and dynamics, gravitation, energy, momentum and theory of relativity. The significant laboratory portion of this course will provide complementary exposure to the concepts discussed in class.

BARD030 **Biology**
This one-semester course presents an introduction to biology. Students explore the nature of life at molecular, cellular, and organismal levels. While this course focuses on biological concepts, an understanding of the chemical reactions underlying cellular function will also be developed. Students also explore organisms within the broader contexts of ecology and the environment. The significant laboratory portion of this course will provide complementary exposure to the concepts discussed in class.

BARD031 **Chemistry**
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This two-semester course presents an introduction to chemistry. Topics include atomic structure, molecular structure, and properties of molecules. Fundamental principles such as kinetics, equilibrium, and thermodynamics will be introduced to describe many chemical reactions. Throughout the course, a heavy emphasis is placed on group and individual problem solving, and on laboratory-based investigations of important phenomena. The significant laboratory portion of this course will provide complementary exposure to the concepts discussed in class.

College Courses

BARD033/BIO101N **Biology I**
BARD034/BIO102N **Biology II**
This two-semester sequence investigates the fundamentals of living systems. Through lectures and laboratory investigations we will explore the structure and function of the cell and the biological macromolecules that build it up and investigate biological systems of two Kingdoms of life: plants and animals. In the first semester, we will also look at key chemical reactions that keep the cell alive and help it carry out its duties, and we will study how single cells function together to build up multicellular organisms as complex as humans. In the second semester, students examine the anatomy and physiology of major plant and animal groups, paying particular attention to mechanisms of reproduction, growth and development. Students become familiar with methods of taxonomy and phylogenetic analysis and engage fundamental principles of evolution including mechanisms of genetic variation and inheritance, population dynamics, extinction and the origin of species.

BARD035/CHEM141N **Chemistry I**
BARD036/CHEM142N **Chemistry II**
This two-semester sequence introduces students to the general principles of chemistry. The courses are designed to provide a solid base in general chemistry as well as to demonstrate applications in related fields. The classes and discussions are intended to provide students with the basic principles and theories of general chemistry. Concurrently, the laboratory, multiple sessions in length, will develop the practical aspects of chemistry by introducing fundamental laboratory techniques and emphasizing the core chemical principles studied in class.

BARD037/PHYS141N **Physics I**
BARD038/PHYS142N **Physics II**
This two-semester sequence introduces the general principles of physics, presenting both a historical perspective and modern applications of these principles. Both concepts and problem solving are emphasized and the importance of experimental physics is demonstrated in the laboratory. The fall semester focuses on mechanisms; the spring semester focuses on electricity and magnetism. Topics include linear and rotational motion, Newton's laws of motion, conservation of energy, momentum, thermodynamics, harmonic motion, wave motion, light, sound, electricity, magnetism, and an introduction to modern physics. Selected topics are studied via multiple session laboratory experiments.

BARD039 **Pre-Medical Pathology II**
Overview of human body functions, including an intro to anatomy and physiology topics, medical cases, and modern medical advances. This course aims at studying the essential wellness practices as they relate to current concepts of preventive medicine; investigates the latest scientific findings relevant to the major diseases and causes of premature death in the U.S. Topics include: Cell Adaptation, Neoplasia I, II, III, Biological Aging, Inflammation, Cell Injury and Repair. This class is the part two to Pre-Medical Pathology I. The basic concepts of biology are needed for this course. HS Biology (or College General Biology I) is the prerequisite to this class**.**

BARD039 **College Health Sciences**
This course presents an introduction to key topics in health sciences, suitable both for students considering medical professions and for those who just want to better manage their own health. Overview of human body functions, including an introduction to anatomy and physiology topics, medical cases, and modern medical advances. This course aims at studying the essential wellness practices as they relate to current concepts of preventive medicine; investigates the latest scientific findings relevant to the major diseases and causes of premature death in the U.S.