

Science Course Descriptions - Brentwood Academy

Science 6 will provide students with a foundation in the life and earth sciences as well as an introduction to laboratory procedures and equipment. Students will learn and implement proper laboratory technique and safety when handling equipment and completing activities. Students will investigate animals and their characteristics in a range of content from invertebrates to genetic material and cellular structures and functions. Students will study earth science with a focus on identifying minerals, the layers of the earth, and landforms such as faults, mountains, and volcanoes. The study of water quality is the basis of a long-term project to reveal the cause of an environmental problem in a realistic scenario using data interpretation and is concluded with a presentation of suggested solutions by the students.

Science 7 provides students the opportunity to explore forces operating in the world on large and small scales. The course includes three units: Astronomy, Forces and Energy, and Climate on Earth. During the Astronomy unit, students will explore different aspects of the universe and planet Earth. We look at the structure of solar system and how this affects life on Earth. The second unit will be over Forces, Motion, and Energy. Students will examine how the three are related and properties of each. We study how matter moves and also study how machines make life easier for us. The final unit will explore weather and climate, emphasizing the effects of heat transfer and density of matter at boundaries between land, bodies of water, and air.

Science 8 is an introductory course in physical and environmental sciences with a strong emphasis on laboratory exploration of concepts. Excellent laboratory techniques and lab safety practices are established and developed all year allowing students to perform procedures like collecting gases by water displacement, measuring reaction rates, and distilling liquid mixtures. Through their laboratory experience, students will grow in their abilities to make observations, draw conclusions and develop experimental plans. The practice of presenting lab information in the form of a lab report will be introduced and developed. Making line graphs from data as well as interpreting the graphs is used through the year. The environmental science portion of the course establishes fundamental principles and traces cycles of matter found in our world such as carbon, nitrogen and water.

Biology is a science that seeks to understand the living world. Therefore, this course will focus on the organization, structure, and function of living things. We will study everything from the unseen world of cells and microorganisms to the human body. Class will provide learning through hands-on labs, team-based activities, lectures, self-study and out of class assignments. One objective is for students to come to a greater understanding of God as the Creator of life by studying the exquisite systems with which life is sustained.

Biology Honors focuses on the organization, structure, function and wonder of living organisms and their environment. One of our main goals is to gain a greater appreciation and awe for God through the study of His creation. Information is learned through experiments, lectures, cooperative teams, as well

as self-study activities and assignments. In this course, we look deeper into the biochemical components that make up living organisms, explore the different aspects and applications of genetics, and study the specific biological processes involved in the metabolic systems of both plants and animals.

Chemistry can be defined as the study of the materials in the universe, interactions between these materials, and the changes they undergo as a result of these interactions. In this class students will be given the tools to reach an understanding of what matter is, how much of what kind is present, how it can be changed, and how fast these changes occur. This will be accomplished by mastery of these concepts: atomic structure, reaction types, chemical bonding, molecular shapes and polarity, kinetic molecular theory and the gas laws, and acid-base reactions. The lab component will emphasize analysis of data and strategies for solving problems.

Chemistry Honors This course will lead students will use new vocabulary to describe invisible, but useful and fascinating ideas about the physical world. Students will study the structure and properties of matter and the nature and mathematics of chemical reactions. Students will be able to articulate concepts such as the kinetic molecular theory of matter, intermolecular forces, dynamic equilibrium, and the role of heat in chemical processes. Students will practice making careful laboratory observations and analyzing experimental error. Students will learn to solve challenging, multi-step problems. In addition to learning specific concepts and skills, students will practice critical thinking and will consider how some important chemical discoveries have affected our lives.

Physics is designed as a survey course to introduce students to the wide range of physical principles governing every day life. From Newton to Einstein, this course will address a range of topics including motion, energy, thermodynamics, waves, optics, electricity, and magnetism. This course balances algebra-based problem solving and conceptual articulation of principles and patterns.

Anatomy & Physiology This purpose of this course is to further a student's appreciation of the systems and functions of the human body and to convince them of the truth of David's words in Psalm 139: *"I praise you because I am fearfully and wonderfully made; your works are wonderful, I know that full well."* Emphasis will be placed on the location, structure and function of organs and organ systems. Instruction will be presented by lecture with Power Point presentations and films to accompany lectures. Assignments will be made to identify organ systems, organs and their component functions from diagrams. The course will also include dissections designed to compare and contrast the anatomy of the human body to the anatomy of other vertebrates.

Anatomy & Physiology Honors This course is designed to further a student's knowledge of the systems and functions of the human body. We will be looking not only at individual organs and systems, but also how they integrate with other systems in the body. For each system we will look at the *anatomy* (the various structures), the *physiology* (how it normally works), and the *pathology* (what can go wrong with the anatomy and/or physiology). We will be using an investigative approach to examine case studies, research current topics, and

conduct laboratory exercises. We will also look at structures from a comparative anatomy standpoint to highlight similarities and differences with other vertebrates.

Marine Biology is a yearlong elective course that satisfies one credit toward the graduation requirement in science. Juniors and seniors primarily will take the course, and it will include a broader introduction to the geology and geographic features of coastal and marine environments, as well as in-depth study of marine organisms. *“For since the creation of the world God’s invisible qualities, His eternal power and divine nature have been clearly seen, being understood from what has been made, so that men are without excuse.” Romans 1:20* This course provides the science student with additional insight into *“what has been made”*. The desired end-state is to develop a deep appreciation and respect for the scope of God’s genius in His creation of the sea world and an absolute conviction that only the hand of a benevolent creator could be responsible.

Psychology is a yearlong elective course but is not considered a lab science for graduation credit. It is a senior level course that provides a college preparatory introduction to aspects of developmental and social psychology, as well as training in psychological research methods. Students will learn how psychology is connected to the social sciences (such as history or economics), the natural sciences (such as biology and chemistry) and, most important, theology and spirituality. God has much to say about our mind and how it functions. We will observe how psychology explores the influences of society on individual behavior and group relationships. In addition, we will learn about the social and biological aspects of human behavior.

AP Chemistry: The goals of the course are to bring students to the level of skill and understanding of a first-year college student who has completed a general chemistry course, and to prepare students for success on the AP Chemistry Exam. Our emphasis will be on application of chemical principles and analysis of laboratory data. The course is structured to develop the six “big ideas” and the seven “science practices” set forth by the College Board.

AP[®] Physics C Mechanics is a college level, calculus-based course in mechanics designed for students interested in a career in physics, astronomy, or engineering. This course follows the syllabus set by the College Board, and students taking this course are expected to sit the AP[®] Physics C Mechanics exam in May. Prior to this class it is strongly recommended that students complete a year of honors physics. All students must have either completed or be concurrently enrolled in a year-long calculus course that covers both differential and integral calculus. Students should leave this class with a strong set of critical thinking skills with which they can approach a variety of problems. Students will be required to apply their knowledge in the laboratory setting to design and/or execute a variety of labs.

AP[®] Physics 1 is an algebra-based, introductory college-level physics course. Students cultivate their understanding of Physics through inquiry-based investigations as they explore topics such as Newtonian mechanics (including

rotational motion); work, energy, and power; mechanical waves and sound; and introductory, simple circuits.

AP Physics 2: AP Physics 2 is an algebra-based, introductory college-level physics course. Students cultivate their understanding of Physics through inquiry-based investigations as they explore topics such as fluid statics and dynamics; thermodynamics with kinetic theory; PV diagrams and probability; electrostatics; electrical circuits with capacitors; magnetic fields; electromagnetism; physical and geometric optics; and quantum, atomic, and nuclear physics.

AP Biology: This course is designed to bring you to the level of skill and understanding in Biology of a college student at the successful completion of introductory Biology, and to prepare you for success on the AP Biology Exam. Our emphasis will be on the application of broad biological knowledge and the demonstration of critical thinking as it relates to our lives and environment. Instruction and study will be structured around the “eight major themes” found in the College Board’s curricular requirements for AP Biology.

AP Psychology: This course is designed to bring you to the level of skill and understanding in Psychology of a college student at the successful completion of introductory Psychology, and to prepare you for success on the AP Psychology Exam. Instruction will be presented through five domains: methods, biopsychological, cognitive, developmental and sociocultural aspects of psychological science found in the College Board’s curricular requirements for AP Psychology.