Science Department Course Descriptions

Advanced Placement Biology (26.06200)

 This course is designed to be the equivalent of a two semester college introductory biology course usually taken by biology majors during their first year. The AP Biology course is designed to be taken by students after the successful completion of a first course in high school biology and in high school chemistry. It 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 topics covered on the course are molecules and cells, heredity and evolution, and organisms and populations. (College Board course description September 2007). *Prerequisites: Biology and /or Chemistry, Math III*

Advanced Placement Chemistry (40.05300)

 This course is designed to be the equivalent of the general chemistry course usually taken during the first college year. Students should attain a depth of understanding of fundamentals and a reasonable competence in dealing with chemical problems. AP chemistry students should study topics related to the structure and states of matter (atomic theory, atomic structure, chemical bonding, nuclear chemistry, gases laws, kinetic molecular theory, liquids and solids and solutions), chemical reactions (reaction types, stoichiometry, equilibrium, kinetics, and thermodynamics), and descriptive chemistry (chemical reactivity, products of chemical reactions, relationships in the periodic table, and organic chemistry). To develop the requisite intellectual and laboratory skills, AP Chemistry students need adequate classroom and laboratory time. It is expected that a minimum of 290 minutes per week will be allotted for an AP Chemistry course. Of that time, a minimum of 90 minutes per week, preferably in one session, should be spent in the lab. The AP Chemistry course is designed to be taken after the completion of a first course in high school chemistry. In addition, the recommended mathematics prerequisite for an AP Chemistry class is the successful completion of a second-year algebra course. It is highly desirable that a student have a course in secondary school physics and a four-year college preparatory program in mathematics. (College Board course description September 2007). *Prerequisites: Chemistry and/or Physics, Math III*.

Advanced Placement Environmental Science(26.06200)

 AP Environmental Science is designed 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 and/or preventing them. The following themes provide a foundation for the structure of the AP Environmental Science course: (1) Science is a process, (2) Energy conversions underlie all ecological processes, (3) The Earth itself is one interconnected system, (4) Humans alter natural systems, (5) Environmental problems have a cultural and social context, and (6) Human survival depends on developing practices that will achieve sustainable systems. (Advanced Placement Course Description, May 1997. The College Board.). *Prerequisites:* *Chemistry and/or Physics, Math III*.

Advanced Placement Physics (40.08300)

 The Physics B course includes topics in both classical and modern physics. Knowledge of algebra and basic trigonometry is required for the course; the basic ideas of calculus may be introduced in connection with physical concepts, such as acceleration and work. Understanding of the basic principles involved and the ability to apply these principles in the solution of problems should be one of the major goals of the course. Students taken this course should cover the following five content areas: Newtonian mechanics, fluid mechanics and thermal physics, electricity and magnetism, waves and optics, and atomic and nuclear physics. The Physics B course should also include a hands-on laboratory component with a minimum of 12 student-conducted laboratory investigations. Each student should complete a lab notebook or portfolio of lab reports. (College Board course description September 2007). *Prerequisites: Chemistry and/or Physics, Math III*.

Biology I (26.01200)

 The Biology curriculum is designed to continue student investigations of the life sciences that began in grades K-8 and provide students the necessary skills to be proficient in biology. This curriculum includes more abstract concepts such as the interdependence of organisms, the relationship of matter, energy, and organization in living systems, the behavior of organisms, and biological evolution. Students will investigate biological concepts through experience in laboratories and field work using the processes of inquiry.

Chemistry(40.05100)

 The Chemistry curriculum is designed to continue student investigations of the physical sciences that began in grades K-8 and provide students the necessary skills to be proficient in chemistry. This curriculum includes more abstract concepts such as the structure of atoms, structure and properties of matter, characterization of the properties that describe solutions and the nature of acids and bases, and the conservation and interaction of energy and matter. Students investigate chemistry concepts through experience in laboratories and field work using the processes of inquiry. *Prerequisites: Physical Science, Math II*

Forensic Science (40.09300)

This course surveys key topics in forensic science, including the application of the scientific process to forensic analysis, procedures and principles of crime scene investigation, physical and trace evidence, and the law and courtroom procedures from the perspective of the forensic scientist. Through virtual and hands-on labs, and analysis of fictional crime scenarios, students learn about forensic tools, technical resources, forming and testing hypotheses, proper data collection, and responsible conclusions. *Prequisites: Biology, Physical Science.*

Environmental Science (26.06110)

 Environmental Science is designed as an integrated and global approach to science and technology. The concepts in this course focus on the links between living things, their surroundings, and the total environment of the planet. The scientific principles, lab practices, and related technology will assist the student in understanding the relationships between local, national, and global environmental issues. The intent of the course is to help individuals become informed, get involved, and care for one’s self and the environment. *Prerequisites: Physical Science*

Honors Chemistry (40.05100)

 The Chemistry curriculum is designed to continue student investigations of the physical sciences that began in grades K-8 and provide students the necessary skills to be proficient in chemistry. This curriculum includes more abstract concepts such as the structure of atoms, structure and properties of matter, characterization of the properties that describe solutions and the nature of acids and bases, and the conservation and interaction of energy and matter. Students investigate chemistry concepts through experience in laboratories and field work using the processes of inquiry. This course is designed for 10th grade students who are preparing to take Physics their Junior year. *Prerequisites: Honors Biology and Math II*

Human Anatomy and Physiology (26.07300)

 The human anatomy and physiology curriculum is designed to continue student investigations that began in grades K-8 and high school biology. This curriculum is extensively performance and laboratory based. It integrates the study of the structures and functions of the human body, however rather than focusing on distinct anatomical and physiological systems (respiratory, nervous, etc.) instruction should focus on the essential requirements for life. Areas of study include organization of the body; protection, support and movement; providing internal coordination and regulation; processing and transporting; and reproduction, growth and development. Chemistry should be integrated throughout anatomy and not necessarily taught as a standalone unit. Whenever possible, careers related to medicine, research, health-care and modern medical technology should be emphasized throughout the curriculum. Case studies concerning diseases, disorders and ailments (i.e. real-life applications) should be emphasized. *Prerequisites: Chemistry and/or Physics, or Intro to Healthcare Sciences*

Physical Science (40.01100)

 The Physical Science curriculum is designed to continue student investigations of the physical sciences that began in grades K-8 and provide students the necessary skills to have a richer knowledge base in physical science. This course is designed as a survey course of chemistry and physics. This curriculum includes the more abstract concepts such as the conceptualization of the structure of atoms, motion and forces, and the conservation of energy and matter, the action/reaction principle, and wave behavior. Students investigate physical science concepts through experience in laboratories and field work using the processes of inquiry. *Prerequisites: Biology*

Physics (40.08100)

 The Physics curriculum is designed to continue student investigations of the physical sciences that began in grades K-8 and provide students the necessary skills to be proficient in physics. This curriculum includes more abstract concepts such as interactions of matter and energy, velocity, acceleration, force, energy, momentum, and charge. This course introduces the students to the study of the correction to Newtonian physics given by quantum mechanics and relativity. Students investigate physics concepts through experience in laboratories and field work using the processes of inquiry. *Prerequisites: Math II, Chemistry*

Scientific Research I(40.09200)

 The Advanced Science Research class is an upper level science elective in where students design, implement, and discuss an independent science project. In doing so, the student will become proficient in the research processes and skills need to solve a problem scientifically. A special emphasis will be placed on research in the course with a goal of students being able to conduct research on a topic at a level appropriate for college coursework.

 The independent study will cumulate with the student entering the project in the Georgia Junior Science Symposium and the Georgia Science Fair to compete against other projects from high school students around the state. Doing well in either of these competitions brings the possibility of competing at the national level. *Prerequisites: Chemistry, Physics*