

# 2011-2012 SCIENCE IN 11/12 GRADE

## **Advanced Biology – Margaret** (yearlong class)

Requirement: B or higher in 9<sup>th</sup>/10<sup>th</sup> Biology.

Advanced Biology is designed to provide students with the conceptual frameworks, factual knowledge and analytical skills necessary to deal critically with the rapidly changing science of biology. Topics include evolution and genetics, RNA and DNA structure and function, gene replication and mutation, viral structure and replication, nucleic acid technology and its applications, anatomy, physiology and ecology. Students will conduct case studies, looking at them from the perspectives of anatomy and physiology, medical procedure and ethical issues.

Students will prepare to take the SAT II Biology Test.

## **Advanced Chemistry – Sarvjit** (yearlong class)

Requirement: B or higher in 9<sup>th</sup>/10<sup>th</sup> Chemistry.

The emphasis in Advanced Chemistry is on the nature of bonding, acids and bases, nuclear chemistry and radioactivity, chemical kinetics, thermodynamics and stoichiometry. Students are encouraged to think independently and to respond to questions that require original reasoning. An essential part of the course is a weekly lab exercise designed to give students further insight into these concepts.

In the third trimester students choose a topic of interest to them and analyze it from a scientific perspective. Examples from past years include the study of fireworks, perfumes, aspirin and polymers. Students will prepare to take the SAT II Chemistry Test.

## **Advanced Physics – Preethi**

Requirement: B+ or higher in Algebra 2/Trig

Each intensive course takes both a theoretical and hands-on approach to the study of physical phenomena. Lab work is an integral part of the program, designed to give students an insight into the working relationship between experiment and theory. Students will learn the essential role that mathematics plays in physics, through advanced problem solving. Working knowledge of trigonometry is essential for these courses (SohCahToa). For their final project, students will conduct a long-term experiment, focusing on theories learnt in the course, to explain what is happening to them every day. This course will include research projects, labs, essays, tests and presentations.

<b>Trimester 1: Mechanics</b> Topics: Motion and Force.	<b>Trimester 2: Energy &amp; 2D Motion</b> Topics: Projectiles, Energy and Gravitation.
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## **Anatomy & Physiology – Margaret**

Is it true that broken bones heal stronger than the original bone? What exactly is cancer? Why should I take vitamins? These questions & more will be addressed in this survey course of the human body. Students will learn about the systems of the body & how they work together to make us function. Case studies & medical approaches will be used to investigate what happens when the systems do not function properly. There will also be multiple dissections throughout the year. Each student will carry out a research project and present his/her findings to the class. This course will include research projects, labs, essays, tests and presentations.

## **Astronomy – Preethi**

Astronomy introduces students to theory and practice of technical amateur astronomy – where are we in the universe? This class introduces students to the historical development of astronomy and the past, current and future of humans in space. They are exposed to the phenomena that can be seen in the urban night sky. Students study the creation of the cosmos and its explosive evolution, the nature of stars and galaxies, the structure and evolution of our Milky Way, and the birth, life, and eventual death of our solar system. This course will include research projects, labs, essays, tests and presentations.

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## **Bioethics – Gina**

This course examines ethical issues relating to the field of biology. Topics may include stem cell research, genetic manipulation, use of natural resources and other topics based upon student interest. The science behind each topic, as well as the viewpoints of the various constituencies will be investigated. This course may include research projects, labs, essays, debates and presentations.

## **Earth & the Environment – Preethi**

This course introduces students to the Earth, its evolution and the fundamental constituents of energy and matter that comprise the biosphere, the dynamics of human populations, renewable and non-renewable resources and the degradation of the environment and its impact on human health. Other topics include how the Earth evolved, environmental effects and the economics and geopolitics of sustainable development. The class emphasizes first-hand observation as well as theory. This course will include research projects, labs, essays, tests and presentations.

## **Forensics – Gina**

You will learn modern forensic methodologies & will invoke the application of scientific methods to solve legal problems. This trimester course will focus on collection & analysis of crime scene evidence (such as serology, toxicology, entomology, odontology and trace evidence), & explore lab analysis techniques, (such as chromatography, DNA analysis, fingerprinting, and hair and footprint analysis). Forensic scientists are also required to testify in court about their methodologies & analysis of evidence. As such, you will be required to clearly and concisely explain the results of labs and techniques you use, and explain the significance of your results in lab. Finally, mock crime scenes will be investigated and real case studies analyzed. This course will include research projects, labs, essays, tests and presentations.

## **Intro to Organic Chemistry & Biochemistry – Gina**

This is an introductory course, which combines both organic and biochemistry. Organic chemistry focuses on the chemistry of carbon. You will be introduced topics to include, structure and reactions of alkenes, alkenes, alkynes, alkyl halides, and aromatic molecules. Biochemistry, sometimes called biological chemistry, is the study of chemical processes in living organisms. This course will include research projects, labs, essays, tests and presentations.

## **Responsible Science – Gina**

This course will look at current issues in science, what it means to be a responsible scientist and the consequences of improvements in science. Topics might include offshore drilling, satellites reentering Earth's atmosphere, nuclear testing and student interest. This course will include research projects, labs, essays, debates and presentations.