Upper Merion Area School District
Curriculum Information for Parents and Community

Science Department
The Upper Merion Area High School Science department uses innovative methods to instill a love and passion for science. Using a combination of labs, hands-on activities, exciting lectures, and collaborative team activities, students are excited to learn about topics in a multitude of areas within science.

Science & Tech
Science & Tech is a state-of-the-art course that focuses on the Designed World. Students will learn how science is in their everyday lives through a four part study of different aspects of our world. The course uses four areas: (1) Materials, (2) Energy, (3) Electricity, and (4) Information to support students in understanding the evolution of the Designed World. Each quarter ends with a hands-on real world project. The goal of this course is to create an excitement and understanding of science to support their work as they move into more advanced sciences.

In the Materials section students will delve into the history and application of how science has been used from early metals to paper and finishing with the plastics we use today. The quarter finishes with the Pringles Design Challenge. Students transition to a study of Energy with a focus on fossil fuels, biofuels, and battery technology. Throughout the quarter students work on a Carbon Footprint project. In the next area students will study Electricity by understanding circuits, generators, and power grids. Students use their knowledge to create a wind turbine and apply the principles of electricity they learned throughout the quarter. The year finishes in the fourth quarter with a study of Information including: switches and sensors, science behind developing different colors, and coding and decoding. Students will enjoy the final project, a Friendship Detector!

Biology
Biology concerns living things, their appearance, different types of life, the scope of their similarities and differences, where they live and how they live. Through the study of the diversity of life, students learn to understand how life has changed over a long period of time. This great variety of life forms continues to change even today as genetic instructions within cells are passed from generation to generation, yet the amazing integrity of most species remains. (from Pennsylvania's Academic Standards for Science and Technology)

The course is designed to help students gain a detailed understanding of cells, cell processes, and the continuity and unity of life.

Chemistry
Chemistry involves the study of matter and its properties. Students examine changes to materials and learn how to observe and measure results. Students study the relationship between matter, atomic structure and its activity. Laboratory investigations of the properties of substances and their changes through a range of

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chemical interactions provide a basis for students to understand atomic theory and a variety of reaction types and their applications in business, agriculture and medicine. (from Pennsylvania's Academic Standards for Science and Technology)

Physics
Physics involves the study of matter and energy. Students examine moving objects and explore the forces and energy that influence their motions. The study of Physics deepens the understanding of the structure and properties of materials and includes atoms, waves, light, electricity, magnetism and the role of energy, forces and motion. (from Pennsylvania's Academic Standards for Science and Technology)

Science Concepts
This course is designed to meet the individual needs of identified students in the area of science. A standards driven, integrated approach focusing on biology is central to the course. Science Concepts covers the same topics that are covered in the CP biology classes in a more supported manner at a moderated pace. Topics covered follow the eligible content for the biology Keystone Exam which students will take in the spring of their sophomore year. This course may be repeated as needed to fulfill the science graduation requirements.

AP Biology
This course is designed to be the equivalent of a college course in introductory biology for biology majors. This course focuses on molecules and cells, heredity and evolution, and organisms and population, and will prepare students for the AP Biology Exam in May. Laboratory work is an essential part of the course. The course activities, assignments, laboratory work, and exams are equivalent to those given in college-level biology classes.

AP Chemistry
This course is designed to be the equivalent of a college course in introductory chemistry for chemistry majors. The topics of the course include the structure of matter, the states of matter, reactions, and descriptive chemistry. Laboratory work, chemical calculations, and the mathematical formation of principles are essential parts of the course. The course activities, assignments, laboratory work, and exams are equivalent to those given in college-level chemistry classes.

AP Physics
This course is designed to be the equivalent of a calculus based college course in physics for physics/engineering majors. The course focuses on Newtonian Mechanics and will prepare students for the AP Physics C Mechanics exam in May. Problem solving is an essential part of the course. After the exam, special topics will be covered. The course activities, assignments, laboratory work, and exams are equivalent to those given in college-level physics classes.

To see our full Program of Studies, look here:
https://hs.umasd.org/info/school-publications/program-of-studies

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