

SCIENCE

Students are required by the State of New York to take three years of Science and pass one Regents exam. All students take the Regents exam in Living Environment (Biology). The Regents Chemistry exam is given to students in Regents Chemistry in the sophomore year. The members of the Science Department endeavor to help all students improve their abilities to see and understand the biological and physical worlds in which they live. By encouraging students to use scientific techniques, both in the laboratory and on the written page, we foster analytic and critical thinking skills. We hope that this "Science Experience" will help prepare the students for the challenges of their continuing education and to become informed citizens of the twenty-first century.

REGENTS LIVING ENVIRONMENT

FULL YEAR – 1 CREDIT

The course emphasizes an in depth understanding of major concepts rather than memorization of science facts. Key topics covered include: Characteristics of Living Systems, Human Structure and Function, Genetics and Mechanism of Inheritance, Genetic Engineering, Variation Adaptation Evolution, Reproduction and Development, Energy Pathways, Disease and Homeostasis, Interdependence, Biotic and Abiotic Interactions, and Technology and the Environment.

APPLIED CHEMISTRY

FULL YEAR – 1 CREDIT

PREREQUISITE: PASSING GRADE IN BIOLOGY & A PASSING GRADE ON EARTH SCIENCE OR BIOLOGY REGENTS EXAM

This is an exciting non-Regents chemistry course that focuses on applying the concepts of chemistry to everyday life. Through laboratory investigations, storylining, discussions, demonstrations, and other related activities, you will be introduced to relevant and topical issues such as the chemistry behind common everyday phenomena.

REGENTS CHEMISTRY

FULL YEAR – 1 CREDIT

This course emphasizes an in depth understanding of the major concepts of Chemistry, all of which deal with the properties of matter, their changes, and the laws that describe these changes. Key topics covered include: Atomic Concepts, Periodic Table, Moles/Stoichiometry, Bonding, Physical Behavior of Matter, Kinetics/Equilibrium, Organic Chemistry, Oxidation-Reduction, Acids, Bases and Salts, and Nuclear Chemistry. Historical content, the scientific method, uncertainty in measurement, significant figures and SI units are included in the introduction of the core.



Emma Kirwin



Mateo Espinosa

CONCEPTUAL PHYSICS

FULL YEAR – 1 CREDIT

PREREQUISITE: PASSING GRADE IN BIOLOGY & A PASSING
GRADE ON EARTH SCIENCE OR BIOLOGY REGENTS EXAM

You will explore the principles of physics underlying the world in which you live by studying concepts and their applications, rather than focusing on mathematical problem solving. You master the course material by reading a text, doing homework and experiments, presentations and taking tests.

PHYSICS

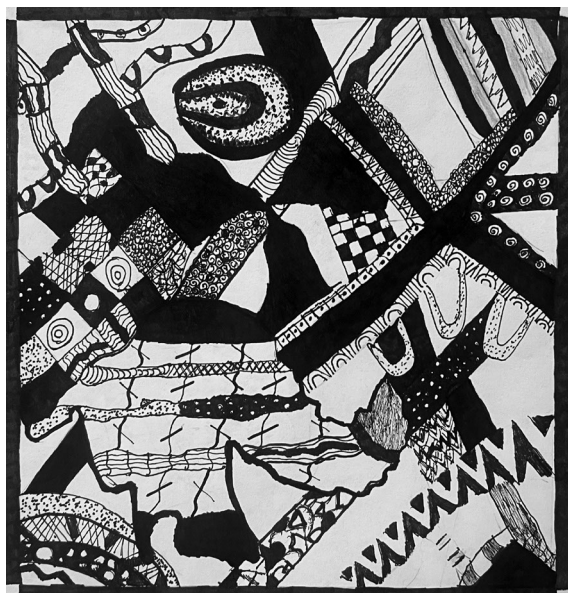
FULL YEAR – 1 CREDIT

PREREQUISITE: PASSING GRADE ON BIOLOGY & CHEMISTRY
REGENTS EXAM

This course is a comprehensive survey of the fundamental concepts of physics. This course is designed to foster the development of critical thinking skills. Typically, four classes per week will be devoted to lecture and problem solving. One or two classes per week are devoted to performing laboratory activities. The goal in the laboratory is to explore and, whenever possible, validate the laws and concepts learned in theory.



Rebecca Smith



Julian Dreni



Sarah Prendergast

ADVANCED PLACEMENT BIOLOGY

FULL YEAR – 1 CREDIT

AP Biology is the equivalent of two semesters of introductory college-level biology. Students cultivate their understanding of biology as they explore evolution, cellular processes, genetics, and ecology, as well as statistics and analysis of experimental data. The class delves deeply into cellular biochemistry and does not cover any body systems. There will also be a field trip to the world renowned Cold Spring Harbor to experience cutting edge DNA technology. This course requires a strong understanding of Regents Chemistry and analytical skills.

ADVANCED PLACEMENT CHEMISTRY

FULL YEAR – 1 CREDIT

The AP Chemistry course provides students with a college-level foundation to support future advanced coursework in chemistry. Students cultivate their understanding of chemistry through inquiry-based investigations, as they explore topics such as: atomic structure, intermolecular forces, and bonding, chemical reactions, kinetics, thermodynamics, and equilibrium.

ADVANCED PLACEMENT PHYSICS 1

FULL YEAR – 1 CREDIT

AP Physics 1 is an algebra-based, introductory college-level physics course that explores topics such as: Newtonian mechanics (including rotational motion); work, energy, and power; mechanical waves and sound; and introductory, simple circuits. Through inquiry-based learning, students will develop scientific critical thinking and reasoning skills.



Adam Parker

**ADVANCED PLACEMENT PHYSICS C
(MECHANICS)**

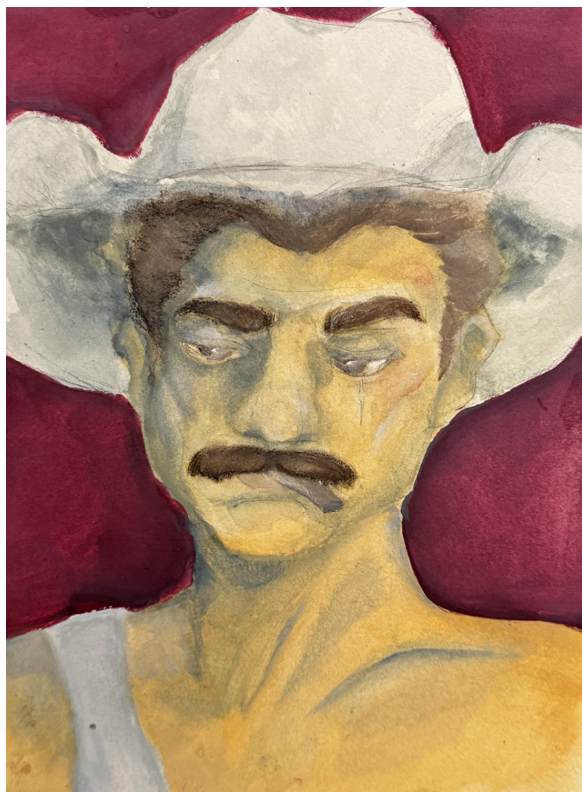
FULL YEAR – 1 CREDIT

Mechanics is equivalent to a one-semester, calculus-based, college-level physics course, especially appropriate for students planning to specialize or major in physical science or engineering. The course explores topics such as kinematics; Newton's laws of motion; work, energy, and power; systems of particles and linear momentum; circular motion and rotation; and oscillations and gravitation. Introductory differential and integral calculus is used throughout the course.

ADVANCED PLACEMENT ENVIRONMENTAL SCIENCE

FULL YEAR – 1 CREDIT

The AP Environmental Science course is designed to be the equivalent of a one-semester, introductory college course in environmental science, through which students engage with the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world. The course requires that students identify and analyze natural and human-made environmental problems, evaluate the relative risks associated with these problems, and examine alternative solutions for resolving or preventing them.



Elena Collins

Science Electives

INTRODUCTION TO SCIENCE RESEARCH

9TH GRADE EXTRACURRICULAR - NO CREDIT

This course is a prerequisite for ninth grade students who wish to participate in Original Science Research class in grades 10-12. This course meets at 7:00 AM before school twice per week. Students join after attending an informational meeting in early November each year. Students will learn about the scientific method, data analysis, presentation skills, and will work towards identifying possible research topics to pursue in the Original Science Research class.

ORIGINAL SCIENCE RESEARCH 1, 2, 3

THREE YEAR PROGRAM - 1 CREDIT EACH YEAR

PREREQUISITE: INTRO TO SCIENCE RESEARCH

Original Science Research is a three-year elective course. In the class, students choose an area of science and conduct a research project, often in collaboration with a professional mentor. Students learn valuable research, organizational, and presentation skills. Additionally, many students enter their work in research competitions.

COURSE OVERVIEW

GRADE 9:

- Students interested in OSR must participate in **Introduction to Research**
- Introduction to Research is a non-credit class that meets before school
- Students learn basics of the scientific method, how to read scientific papers, and begin selecting topics for their research.
- Interested students and their parents attend an informational meeting in mid-November (date TBA), and classes start in mid-November.

GRADE 10:

- Students narrow their area of interest and read textbooks and scientific journal articles to become "experts" in their field.
- Students identify researchers who can serve as potential mentors and approach these professionals about working with them.
- During the school year or over the summer, students begin designing a research plan with the mentor.
- Most students work on their projects during the summer.
- Many students enter their projects in research competitions junior and senior years.

GRADE 11:

- Students who have completed projects/collected data work on research papers and posters to enter into research competitions.
- Many students return to the laboratory during the summer following junior year.
- Students must finish their research by the beginning of Senior year.

GRADE 12:

- Students finish any remaining work on their research project.
- Seniors write a research paper and create a poster for research competitions.

ANATOMY & PHYSIOLOGY

FULL YEAR - 1 CREDIT

PREREQUISITE: PASSING GRADE IN BIOLOGY

Human Anatomy and Physiology explores the inner workings of the human body and focuses on anatomical and medical terminology. This course is the perfect foundation for students wanting to expand their vocabularies and learn about the body and its levels of organization, as well as the cooperation required between those levels. Course content includes the study of biological molecules, biochemical processes common to living organisms; cellular structures and functions; tissue structure and function; and a comprehensive study of the structure and function of the integumentary, skeletal, muscular, neurological, endocrine, cardiovascular, immune, lymphatic, respiratory, digestive, urinary, and reproductive systems. Students will finish the course with a dissection unit where they observe structures closely analogous to the human body in a fetal pig.

FORENSICS

FULL YEAR - 1 CREDIT

PREREQUISITE: PASSING GRADE ON BIOLOGY, CHEMISTRY & PHYSICS

In this course we will explore the science behind investigation, forensics, and how different types of evidence have played key roles in real life cases. We will explore the psychology behind observation, the advent of DNA matching and its effect on current and past cases, the use of trace evidence to indicate contact between victims and possible suspects, and a variety of other types of evidence and the scientific techniques that allow them to be analyzed. This class will place an emphasis on hands-on laboratory activities, discussion, and group work.