AHS Science Pathways

What science classes to take and when to take them

AHS Science Department

- Laura Guthrie – Physics, Honors Physics, Chemistry (room 501)
- Tom McNamara – Chemistry, AP Chemistry (room 401)
- Dan Reyes – AP Biology, Chemistry (rooms 303 and 402)
- Rick Kravitz – Chemistry, Geology (rooms 401, 301)
- Jada Paniagua – Environmental Science, AP Environmental Science, Biology (room 303)
- Ben Matzen – Biotechnology, Biology (rooms 402 and 301)
- Jan Heaton – Physiology, Biology (room 202)
- Misha Bushel – Engineering (room 502) (also a member of the math department)
- Lori Tewksbury – Biology, Department Chairperson (room 201)

AHS Graduation Requirements

- The requirements for graduation are two years of laboratory science
  - 1 year of life science (Biology) and
  - 1 year of physical science (Chemistry or Geology)

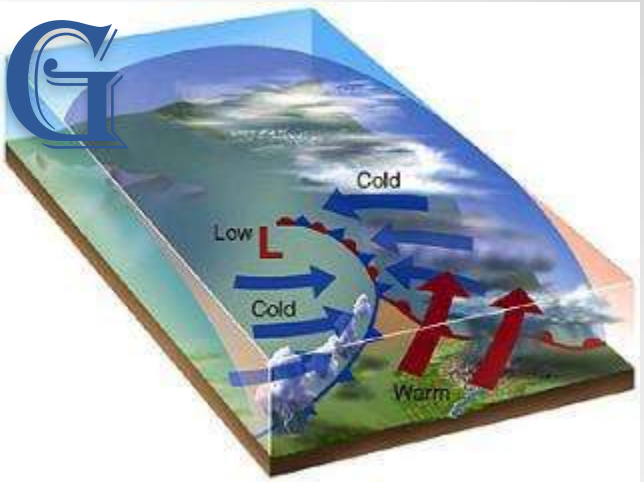
UC and Other University Recommendations

- UC's and many other private and public universities recommend at least another (third) year of laboratory science
- We have a variety of science classes that can fulfill this recommendation, though for students who are contemplating studying science, math, engineering, etc. at college, we highly recommend they take physics before they leave high school

Biology

- Biology is the study of life! We look at life at the molecular level all the way up through the ecosystem and biome levels. We also explore the scientific method and focus on the tools of scientists – graphing, laboratory skills, and the metric system. Biology is designed to give students an introduction to the life sciences and prepare them for future science courses.
- Biology is a sophomore level, college-prep course and fulfills the life science graduation requirement. Accelerated freshmen (freshmen who have had algebra 1) are also encouraged to enroll.
- Biology includes laboratory investigations, projects, critical reading and writing assignments, and unit and semester exams.

GEOLOGY



Geology is an Earth Science course that brings the student in touch with the everyday occurrences and observations of the world around us. It is a very manageable class with short weekly lecture, many activities/labs and minimal homework. There are weekly quizzes and 3 Unit Exams per semester. Finals are cumulative. There is no math pre-requisite and the course is inclusive to all students.

The main focus of the course is to enlighten students to the scientific and natural processes of the world they see and experience every day, from the earth beneath their feet, to the weather they are exposed to and the water they drink and finally, the celestial bodies of the heavens.

Chemistry

Recommended Pre-requisites:

- [A or B grade in Biology] and
- [A or B grade in Geometry]

Course Description:

Students learn about matter and how matter changes. The emphasis is on *new scientific vocabulary*, *hands-on activities*, *demonstrations and labs*, and *mathematical applications* of science.

Goals of Course:

To be able to correctly *organize* different chemicals and *explain* their physical and chemical properties; to be able to *predict and explain* how chemicals interact with each other using scientific language and mathematical principles.

Physics *the study of matter, energy, and interactions*

Students will study how the universe works, using calculations and experimentation to analyze patterns in nature.

The course includes units ranging from motion and forces to sound and optics.

recommended course preparation: chemistry and algebra 2/trigonometry

Honors Physics

Although physics and honors physics include the same major units, honors physics is mathematically and conceptually more rigorous. Honors physics also includes subtopics within units for which regular physics students are not responsible.

recommended course preparation: a minimum of a B in chemistry and in algebra 2/trigonometry

APES and ES study: Ecology, Population Biology, Water, Agriculture, Minerals, Energy, Toxicity and Waste Treatment, and Sustainable Future

Environmental Science

- Significant amount of gardening
- More time on each topic
- More activities, projects, articles, and films to support learning
- Less Homework
- NOT a UC Lab Science; yes a UC elective

AP Environmental Science

- No gardening
- Quicker pace
- More in depth scientific understanding
- Chemistry helpful
- Focus on AP test prep
- YES UC Lab Science; 6-7 long formal labs
- College Level Expectations

AP BIOLOGY

ACALANES HIGH SCHOOL

- **Recommended Prerequisites**
- (A or B in Biology) and
- (A or B in Chemistry).
- **Course Description**
- An advanced, college-level course designed to explore in great depth the basic biological principles. Topics covered include cells, biochemistry, genetics, evolution, ecology, and biodiversity. Special emphasis on inquiry-based (laboratory) activities as well as high-level scientific vocabulary.
- **Course Objectives**
- (1) All students will demonstrate a thorough comprehension of the topics above.
- (2) All students will demonstrate a mastery of laboratory skills (quantitative and qualitative data must be collected).
- (3) All students will use the scientific process for their inquiry-based learning.

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AP Chemistry

Recommended Pre-requisites:

- [A or B grade in Chemistry] and
- [A or B grade in Physics] and
- [A or B grade in Algebra II/Trigonometry]

Course Description:

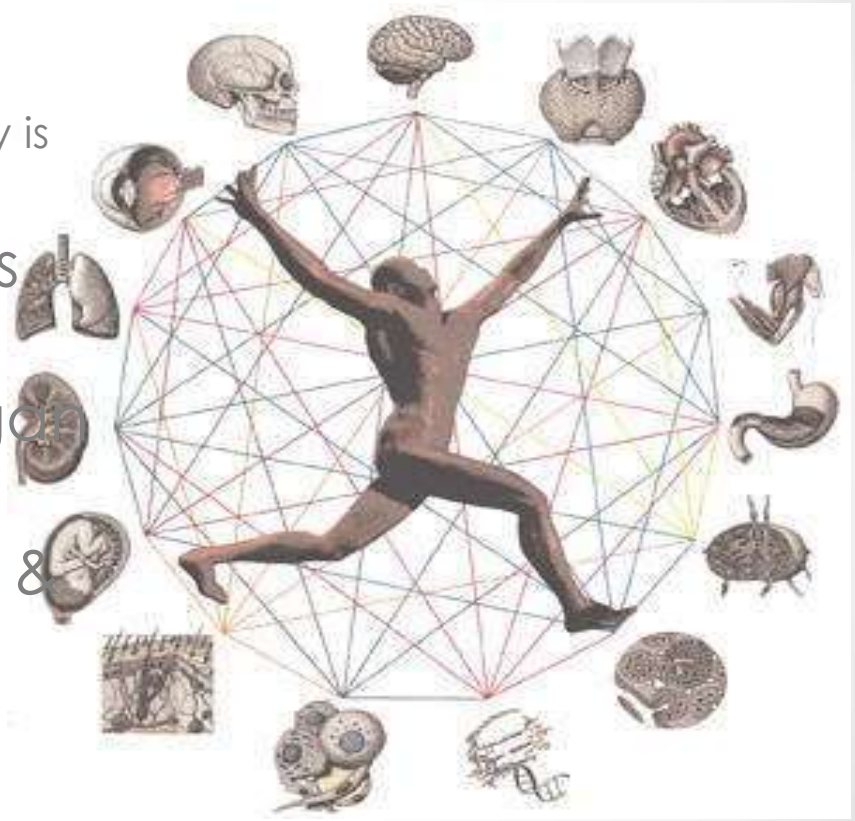
Students study matter and how matter changes at an advanced level. The emphasis is on *college-level* scientific vocabulary, *inquiry-based* hands-on activities and labs, and *advanced* mathematical applications of science.

Goals of Course:

To be able to correctly *organize* different chemicals and *explain* their physical and chemical properties at a college level; to be able to *predict* and *explain* how chemicals interact with each other using the advanced scientific language and mathematical principles covered in the first semester of an introductory college Chemistry course.

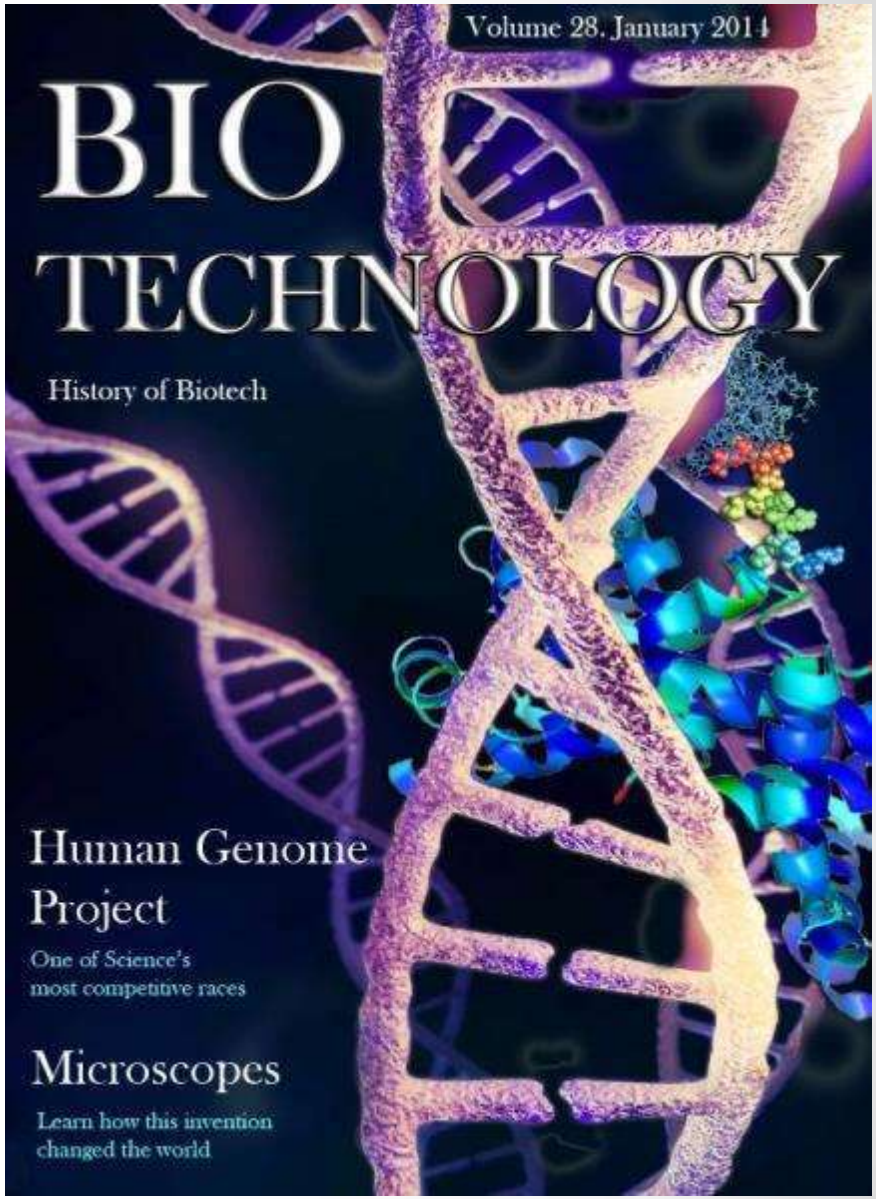
Physiology

- The study of the human body and how it works.
- Open to Juniors and Seniors
  - Biology and either Chemistry or Geology is required.
- Lab and Hands – On Activities
  - Attendance & Participation is key
- Examples: cat dissection, organ dissections, blood typing, reflexes, ECG, blood pressure & many more



Biotechnology

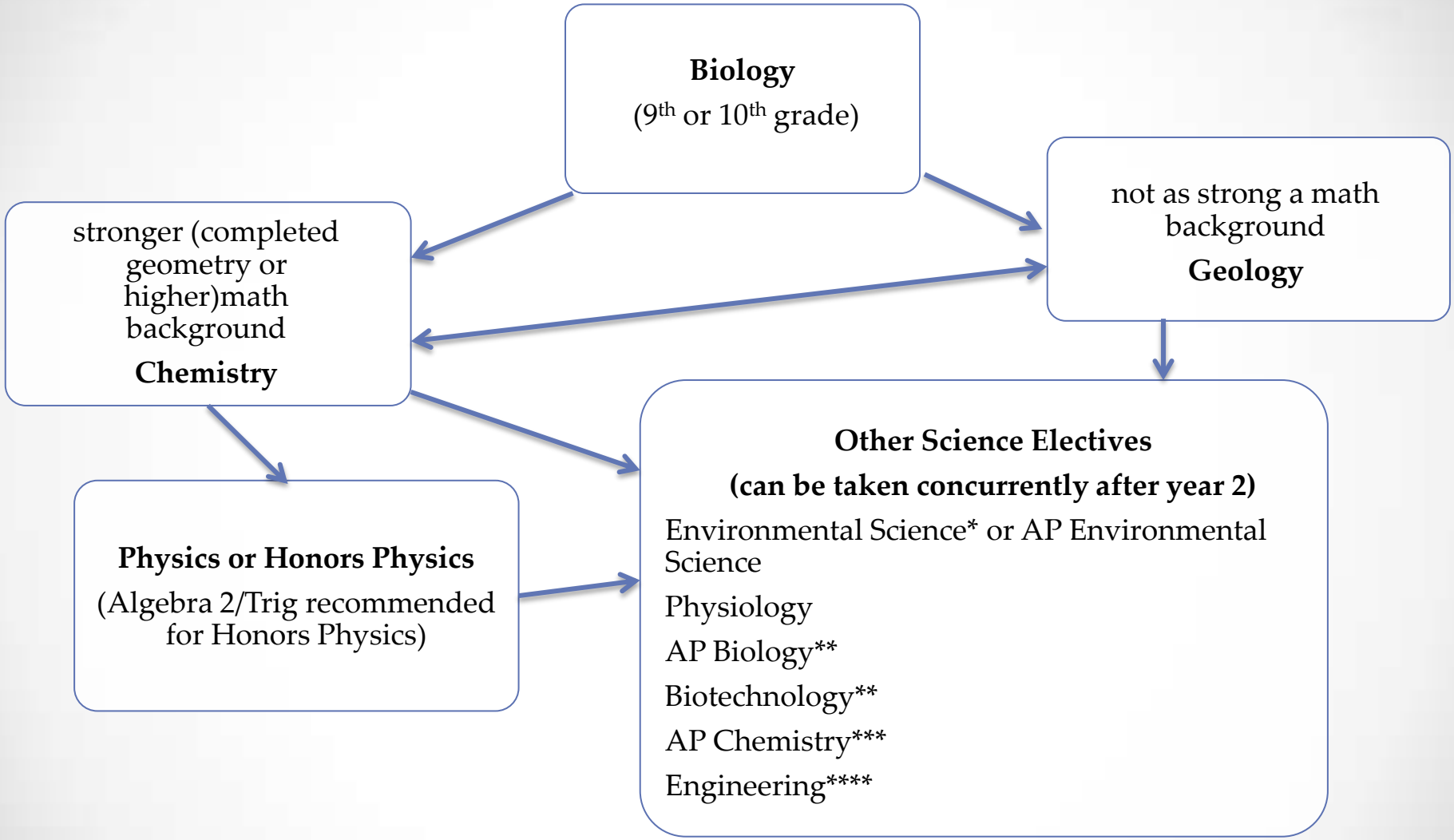
- Biotech is a Regional Occupation Program (ROP) course designed to provide students laboratory skills.
- ROP requires students be 16, so the course is generally open to Juniors and Seniors.
- Being skills-based, less time is spent on curriculum compared to traditional science courses. Chemistry is a strongly recommended pre-requisite for this course.
- During this course students will conduct labs including electronic sensor use, gel electrophoresis, and polymerase chain reaction (PCR), among others.



Engineering & Applied Physics

- Course material will include topics typically found in an introductory college engineering course
- Branches of engineering covered will include chemical, mechanical, civil, aerospace, electrical, and biomedical
- Students will perform a variety of structured activities, as well as complete a final project incorporating topics covered throughout the school year
- Recommended Pre-Requisite Courses: Physics; Algebra 2/Trig or Pre-Calculus

Pathway Choices – a flowchart



* **Environmental Science fulfills UC elective requirement but not the laboratory-based science requirement**

** **Previous completion of chemistry strongly recommended for AP Biology and Biotechnology**

*** **Previous completion of chemistry and either previous completion or concurrent enrollment in physics strongly recommended for AP Chemistry**

**** **Previous completion of physics strongly recommended for Engineering**

Any questions?