



Saint Francis High School Science Department

Science Course Information for Incoming Freshman

What is the Science Department's Vision for students?

- In the tradition of Holy Cross, the Saint Francis science department seeks to develop both the hearts and minds of our students to support our school's Graduation Outcomes.
- A Saint Francis science graduate should be a person who exhibits **curiosity** for our natural world and utilizes the **scientific method** to solve societal problems.
- Through our science curriculum, the department seeks to develop **compassionate** students committed to **environmental** and **social justice**.

What does the Science Program look like for Saint Francis students?

- Students are required to complete three years of science for graduation, and the overwhelming majority take four years of science.
- Students are guaranteed one science course request each academic year for a total of four years of science. During the 11th or 12th grade year, students may request a 5th science course as an elective. Students who wish to take this pathway should carefully read course prerequisites and plan their 4-year pathway in science starting with the freshman year.
- **Typical Science Pathways include:**

Year	College Preparatory	Advanced College Preparatory	Honors/Advanced
9th	Biology*	Biology or Biology-Honors	Biology-Honors
10th	Physical Science [#]	Chemistry or Chemistry-Honors	Chemistry-Honors
11th	Science Elective**	Physics or Physics-Honors	Physics-Honors
12th	Science Elective (optional)	Science Elective or AP Science	AP Science

* Either Biology or Biology-Honors fulfill the life science graduation requirement of freshman year

Chemistry, Chemistry-Honors, or Conceptual Physics fulfill the physical science requirement of sophomore year

** Current Science Electives include: Environmental Science¹, Exercise Science and Sports Medicine, Marine Biology, AP Biology², AP Chemistry², AP Environmental Science (APES)¹, and AP Physics C². The Design department also offers Engineering, Biotechnology or Robotics as a science-related elective; these do not meet the science graduation requirements but are UC/CSU lab classes (except Robotics).

¹ See prerequisite requirements for these classes. They are an either/or choice, with APES requiring completion of biology and chemistry before enrollment; either may be requested in 11th grade concurrent with physics or taken alone in either 11th or 12th grade.

² AP Biology, AP Chemistry, and AP Physics C require the completion of biology/chemistry/physics sequence before enrollment, therefore, are only open to seniors. As a 5th-year of science, students may request two of these AP sciences in 12th grade. AP Biology and AP Chemistry each require two periods of a student's course schedule for additional lab work. AP Physics C requires completion of a year of calculus before enrolment.

What are the requirements for freshman-year Biology-Honors vs. Biology enrollment?

- Incoming freshmen who place into **Geometry or higher math** AND show **strong reading comprehension skills** (as shown by an HSPT reading score of 85% or higher) are offered the opportunity to enroll in Biology-honors.
- Students who qualify for Biology-Honors are NOT required to enroll in the course and are free to balance their freshman year course load by taking Biology. This does not impact their ability to qualify for Chemistry-Honors in their sophomore year. See the description of sophomore year below for more information on this course.
- All other students at the Algebra 1 or Algebra 1-H math level will be placed into Biology for the freshman year.

What are the differences between the Biology-Honors and Biology courses?

- The course content will be very similar, as both Biology-Honors and Biology align with the California NGSS 3-course model for The Living Earth: Integrating Biology and Earth Science.
- Biology-Honors will go into greater depth and at a faster pace (to cover more topics) than Biology. It's often hard to say which has a greater homework load because honors-level really requires that a student have excellent reading comprehension and organizational skills. In general, honors courses could have twice the homework of a college prep course, e.g., 1 hour vs. 30 minutes between class periods.
- Biology-honors extends topics covered in Biology by exploring phenomena with additional complexity and additional emphasis on cellular and molecular biology topics. Students will explore more complex models of cellular processes, use scientific journal articles as data sources for making claims based on evidence, and utilize math and computational thinking in more applications than Biology. The additional depth in this course is most notable in the following areas:
 - Arguing from evidence the impact keystone organisms have on ecosystems
 - A greater emphasis on molecular biology in the topics of photosynthesis and cellular respiration
 - Epigenetic mechanisms for gene expression are explored in greater detail.
 - Calculating probabilities for inheritance of traits as well as allele frequencies in populations utilize more complex models (Dihybrid crosses and Hardy-Weinberg equilibrium)
- Highly successful Biology-Honors students are able to self-organize their study. They read relevant portions of the textbook on their own and complete extra practice (such as making vocabulary flashcards) without prompting from their teacher. Successful Biology-Honors

students are highly proactive in asking questions during class and seeing their teacher during our collaboration period for help when they don't understand concepts.

What are the requirements for sophomore-year science courses at Saint Francis?

- Students in their sophomore year will complete their physical science requirement for graduation by taking either Chemistry, Chemistry-Honors, or Conceptual Physics (see below for more information on each course).
- For **Chemistry-Honors placement** as a sophomore, students must pass the qualifying exam (with a 70% or higher score) administered by the Science Department in the early part of the second semester. Students must also achieve certain grades in science and math courses for the fall semester. The required grades are a B or higher in Biology-Honors and honors math courses and an A (not A-) in Biology and college prep math courses. Students also need to be concurrently enrolled in Algebra 2 or higher math (preferably Algebra 2 Trig-Honors to be on track for Physics-Honors enrollment in junior year if they are planning that course pathway).
- For **Chemistry placement** as a sophomore, students are recommended to have successfully completed biology (generally with a B- or higher grade) and be concurrently enrolled in Algebra 2. Concurrent enrollment in Geometry is acceptable, but students must have strong Algebra 1 skills and concurrent math course will impact their science course choice in the junior year (physics requires concurrent enrollment in precalculus or higher math).
- For **Conceptual Physics placement** as a sophomore, students will be concurrently enrolled in a Geometry-level or higher math, and this will be the only physics course they take.

What are the actual Course Descriptions for Biology and Biology-Honors from the Saint Francis Course Bulletin?

621 BIOLOGY

Full Year

The basic concepts of biology are introduced through the lens of sustainability on planet Earth including science literacy, ecology, energy and matter in ecosystems and organisms, feedback and homeostasis, genetics and evolution. An emphasis is placed on developing skills valued by the scientific community such as critical thinking, arguing from evidence and evaluating scientific texts. Labs and activities will be used to demonstrate application of topics. This course is aligned to the California NGSS 3-course model for The Living Earth: Integrating Biology and Earth Science.

Prerequisites/Comments

9th grade standing. For continuation into Chemistry/Chemistry-honors, Physics/Physics Honors during sophomore year, students will need to complete the math requirements for those courses and pass a qualifying exam for the honors courses. UC/CSU Area D.

622 BIOLOGY HONORS

Full Year

The investigative approach is used to acquire the basic biological concepts and skills. Topics covered include cell chemistry and physiology, plant and animal morphology, evolutionary development, genetics, and ecology. The course addresses itself to the social consequences of our actions as we attempt to solve the biological problems

we face. This class places emphasis on applying the concepts of modern biology to relevant current topics during laboratory and other activities in the classroom. There will be long-term projects during each semester. The pace of Biology Honors is faster and covers topics in more depth than Biology. This course is aligned to the California NGSS 3-course model for The Living Earth: Integrating Biology and Earth Science.

Prerequisites/Comments

9th grade standing. Incoming freshmen may elect to enroll in Biology-honors based upon student placement into geometry or higher level math and a High School Placement Test reading score above 85%. UC/CSU Area D.