



# SCIENCE OVERVIEW



CS

**CONTEMPORARY SCIENCE** (*Davidson Explore Only*): this middle school course will introduce students to basic chemistry and physics principles. The main focus of this course will not be content knowledge (although students will gain content knowledge through the course) but instead on developing science skills such as: using the scientific method to design and evaluate investigations, writing proper lab reports, conducting scientific research online, evaluating sources and information for validity, using proper laboratory techniques, and collaborating with peers, and engaging in the engineering process.

ES

**ENVIRONMENTAL SCIENCE:** a middle school class, designed to introduce students to major ecological concepts and interactions between humans and their environment. Students will explore principles and methodologies to understand the natural world and our relationship to it.

IB

**INTRODUCTION TO BIOLOGY:** this middle school course will explore the evolutionary relationships of organisms from the cellular level up through their place in the biosphere. The class will examine how organisms' form and function aid survival, with an emphasis on comparative anatomy.

## DAVIDSON EXPLORE

Davidson Explore (DE) courses are offered through the Davidson Institute for Talent Development and not by the Davidson Academy. They are often taught by Davidson Academy staff. Is.

## SCIENTIFIC REASONING

Environmental Science and Introduction to Biology are offered in alternating years and give our youngest students two full years to build their scientific reasoning skills.

## PLACEMENT IN SCIENCE

Students are welcome to take a placement test for any level of science they want to try. Beyond that, we also use the diagnostic period to determine placements. During those first three weeks, teachers look at lab skills, accuracy of measurements, analytical skills, and more to determine appropriate placements. Students who are interested in **an advanced science course** must either complete the introductory version of the course or receive teacher approval after placement testing or the diagnostic period.

PS

**PHYSICAL SCIENCE:** our last middle school course offers students a semester of physics and a semester of chemistry that sets them up to be successful in our high school chemistry and physics courses. Students will apply Newton's Laws to various situations, apply conservation of energy to physical systems, and design and implement scientific experiments. During the chemistry section, students will focus on the physical laws that govern the universe and characteristics of matter- including the changes it undergoes – from the microscopic (atomic) level to the macroscopic (universal) level.

B

**BIOLOGY:** a high school credit course with a focus on cellular biology. Students investigate how cells exchange matter and energy with the environment. Units on genetics, evolution, and microbiology round out the course.

AB

**ADVANCED BIOLOGY:** authentic laboratory experiences in which students design and conduct original experiments on local insects. A reading-heavy course, students should expect daily reading and question sets. Students are required to take a one-semester advanced laboratory elective on Fridays as a component of this course.

CH

**CHEMISTRY:** this course covers the major principles, concepts, and applications of chemistry in a hands-on approach. Chemical topics include measurements and units, atomic structure, periodic table, chemical nomenclature, molecular bonding and structure, chemical reactions, stoichiometry, solution chemistry and gases. Students will become skilled at performing experiments, making accurate observations and measurements, interpreting data, and writing lab reports. Co-requisite: Alg II.

## REQUIRED CREDITS

Students need four credits of high school science for graduation (three core credits and one science elective). This includes one credit in each of the three sciences (biology, chemistry, physics), plus an extra course(s) in an area of interest. The elective credit can be an additional course in a core science or earned through Friday electives.

Some universities have science requirements for admissions, and students should look into those requirements for the universities they are most interested in.

## CREDIT BY EXAM

Unlike in math, we do not give CBE credits in science. The placement tests check readiness for a given level, rather than mastery of a given level. Science classes are dynamic in what they cover each year, and the lab work is a big part of the science experience, so just showing some content knowledge is not enough to justify credit in these subjects.



**ADVANCED CHEMISTRY:** in this advanced high school course, students will gain a deep understanding of chemistry and strong critical thinking skills used to tackle chemical equations. Topics include: atomic structure and properties, molecular and ionic compound structure and properties, intermolecular forces, chemical reactions, kinetics, thermodynamics, equilibrium, and acid-base chemistry. Regular laboratory experiments emphasize quantitative and qualitative techniques that complement the course content. Students are required to take a one-semester advanced laboratory elective on Fridays as a component of this course. Prerequisite: Alg II



**PHYSICS:** this course covers mechanics, waves, thermodynamics, optics, fluids, and quantum and special relativity. This is an inquiry based class in which students will be thinking critically about the world around them and about their own thinking. Co-requisite: Alg II.



**ADVANCED PHYSICS:** this course covers mechanics and electricity and magnetism. Students will be conducting their own experiments, analyzing data, and writing lab reports. Co-requisite: Calc I.

## ORDER OF THE CLASSES

There is no particular order in which the science classes are taken. After taking physical science, students are ready for either physics or chemistry—the choice is theirs. Alternatively, they may want to go to biology if they find that subject more appealing than what was covered in physical science. After taking one “regular HS” level class, some students choose to go on to the advanced level in that same subject; others choose to do all three of the regular science classes before taking an advanced science. Some students skip most or all of the regular level classes, and with a teacher’s approval, go straight into the advanced classes. There is not a right or wrong way to progress.

