

Science Course Sequences and Graduation Requirements – 2019



“It is highly recommended that students planning to apply or attend college take four science courses to include Biology, Chemistry, and Physics.” - [VDOE Approved Courses document](#).

Considerations for Standard and Advanced Diploma:

Students working for the 22 credit (standard) diploma must have three credits from two different areas: biological science, chemical science, earth science, and physical science.

Students working for the 26 credit (advanced) diploma must have four credits from three different areas.

Discipline	Course	Pre-Requisites
Biological Sciences	Any biology course under 4310XX ¹	Biology and Chemistry
	Environmental Science ²	
	AP Biology ¹	
	IB Biology SL, HL ¹	
	AP Environmental Science ^{1,2}	
	IB Environmental Systems SL ^{1,2}	
Chemical Sciences	Any chemistry course under 4410XX ¹	Biology and Algebra 1
	Honors Chemistry ¹	Biology and Geometry
	AP Chemistry ¹	Chemistry and Algebra 2
	IB Chemistry SL, HL ¹	
Earth Sciences	Environmental Science ²	
	Geosystems (4220XX) ¹	Biology and 1 other science
	Honors Geosystems ¹	Biology and Chemistry
	Oceanography	Biology and Chemistry <i>or</i> Geosystems
	Astronomy	Biology and Physics <i>or</i> Geosystems
	Geospatial Analysis	3 Lab Sciences
	AP Environmental Science ^{1,2}	Biology and Chemistry
IB Environmental Systems SL ^{1,2}		
Physical Sciences	Any physics course under 4510XX ³	See extended descriptions on page 2
	AP Physics (1, 2, C) ¹	
	IB Physics SL, HL ¹	
	Engineering Physics	
Other	Science Research	

¹ Indicates that the course has an external exam, either VA SOL EOC or IB/AP test.

² Course can be classified as either a Biological **or** Earth Science credit towards graduation requirements.

³ Active Physics is designed for students weak in Math 8 or Algebra 1. Not for seniors to get a final science credit. It is not recognized as a physics course by VA colleges/NCAA.

Considerations for Earth and Environmental Sciences:

Environmental Science	APES/IBESS
Open to grade 9	Open to grades 11,12
None	External exam (college credit possible)
No point (GPA)	+1.0 point (GPA)
Foundational science course that integrates biology, earth science, chemistry, and engineering	Advanced science course for students in discipline of environmental studies

Geosystems Honors	Standard Geosystems
Open to grades 11,12	Open to grades 11,12
SOL EOC test	SOL EOC test
+0.5 point (GPA)	No point (GPA)
Laboratory and technology components (ArcGIS)	Laboratory and technology components (ArcGIS)
Externally moderated project (science fair) required	none

Considerations for Physics:

AP Phy C - Mech and E&M	OR	AP Phy C - Mech	AP Phy C – E&M
Open to grades 11,12		Open to grades 11,12	Open to grades 11,12
2 External exams (2 semesters college credit possible)		1 External exam (1 semester college credit possible)	1 External exam (1 semester college credit possible)
1 credit yearlong class		1 credit yearlong class	1 credit yearlong class
+1.0 point (GPA)		+1.0 point (GPA)	+1.0 point (GPA)
Co-Req of AB or BC AP Calculus		Co-Req of AB or BC AP Calculus	Co-Req of AB or BC AP Calculus
Pre-Req of Physics		Pre-Req Chemistry	Pre-Req of Physics
Advanced Physics topics in both Mechanics and Electricity & Magnetism using Calculus		Advanced Physics topics in only Mechanics using Calculus	Advanced Physics topics in only Electricity & Magnetism using Calculus
		These two courses can be taken concurrently or over the course of two years.	

AP Physics 1	Physics 1 HN	Physics 1	AP Physics 2
Open to grades 11,12	Open to grades 11,12	Open to grades 11,12	Open to grades 12
External exam (1 semester college credit possible)	None	None	External exam (1 semester college credit possible)
+1.0 point (GPA)	+0.5 point (GPA)	No point (GPA)	+1.0 point (GPA)
Co-Req of Pre-Calculus	Co-Req of Pre-Calculus	Pre-Req of Geometry	Pre-Req of Physics
Similar depth and mathematical rigor (Algebra-based) to Physics 1 HN. Equivalent of a first-semester introductory college course.	More depth in all Physics 1 topics and more mathematically challenging problems. Algebra-based.	Scientific investigation, nature of science, motion, forces, energy, waves, fields, circuits, and non-Newtonian topics	Second course in Algebra-based Physics sequence. Extended topics such as thermodynamics and optics.
Externally moderated project (science fair) required	Externally moderated project (science fair) required	none	none

Challenges involving transfer students:

Physical Science (physics and chemistry content only) is an 8th grade science course in VA, and there is no Virginia School Board approved code to match it to, so there is no way to apply it to a standard high school science credit. The course can count as a credit in the elective category.

Integrated Science (usually three different sciences) can count as a specific science discipline IF there is a syllabus review and there is sufficient content to apply the course to one of the science disciplines. It counts as a science credit, and can be applied to the fourth science credit for an advanced studies diploma. Contact the science office for assistance with the syllabus review.

The state of VA requires three science credits from two disciplines for a standard diploma. **To earn an advanced studies diploma a student must have 4 science credits from 3 different science disciplines, regardless of their status as a transfer student.**