A big blue transformative SUMMER living & learning at Phillips Academy

UPPER SCHOOL COURSE CATALOG
SUMMER 2021

ON-CAMPUS PROGRAMS
### TYPICAL DAILY SCHEDULE
**Summer Session – Upper School & English Language Learners (ELL) Program**

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<th>MONDAY</th>
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*Please note – this schedule may change due to the need to ensure student safety through social distancing and supervision in 2021, based on new public health guidance and best practices in residential settings. The schedule above reflects the typical commitment of a student in the Upper School in 2019.*
Program Selection:
When applying for admission, students will select the on-campus program they are seeking: our traditional Upper School program or Upper School ELL (geared toward non-native English speakers seeking to improve their written and spoken English skills). Offers of admission are issued to students for the specific program to which they have applied. Applications are considered on a rolling basis, until all spots in a program are full.

Course Selection:
Upon enrollment, students and parents will have the opportunity to submit their course requests through the Parent Portal. Boarding students will all select two courses, while day students have the option to select either one or two. As courses are filled, they will become unavailable for new sign-ups on the Parent Portal; thus, it is in students’ best interests to apply, enroll, and select courses early in order to ensure those in which they are most interested are still open for enrollment.

When selecting courses, students will enroll in a course that meets during Period 1 and another that meets during Period 2. Timing of course availability is detailed in the catalog that follows. Period 2 courses may meet during the 2a or the 2b time slots; specific course times and locations will be communicated upon arrival.

As noted above, boarding students are required to enroll in two courses, while Day students may select one or two course periods.
ARTS - VISUAL AND PERFORMING

Acting and Performance
Grades 9–12 | PERIOD 2

Working from the ground up, students learn how to use their minds, bodies, and voices as professional actors do. Beginning with physical and vocal exercises, improvisation games, and other ensemble-building workshops, the course then moves on to more advanced acting techniques. Students explore some of the most influential theatre styles, plays, and characters—as well as creating their own—through rehearsal and in-class presentation, culminating in a public performance of their work from the summer. No prior theatre experience necessary; this class is equally suited for beginners or performance pros.

Digital Photography
Grades 9–12 | PERIOD 2

Students learn the basics of photography and how to use digital cameras, then scan their images into Adobe Photoshop, where they can transform them by adding color and using the program’s many altering techniques. Through this class, students gain an understanding of photography and how technology can improve their images. The ultimate challenge is for students to push their creative limits. Students are encouraged to bring a digital camera; those who do not have one are welcome to borrow one for the duration of the program.

Drawing and Painting
Grades 9–12 | PERIOD 1

The fundamental elements of drawing—line, shape, value, perspective, and composition—are emphasized in the initial weeks of this course. Students are introduced to a variety of materials (graphite, charcoal, ink, and acrylic) through a series of exercises that celebrate drawing as a creative act. From drawing, students can expand into the realm of painting and mixed media, working from a variety of approaches.

Graphic Design
Grades 9–12 | PERIOD 2

Have you ever tried to design a poster, flyer, business card, yearbook, or class presentation and been stymied by the considerable choices you must make? In our information-driven society, graphic design principles and concepts are needed more than ever to bring balance, clarity, and visual appeal to all varieties of content. According to noted graphic designer Paul Rand, “To design is much more than simply to assemble, to order, or even to edit; it is to add value and meaning, to illuminate, to simplify, to clarify, to modify, to dignify, to dramatize, to persuade, and perhaps even to amuse. To design is to transform prose into poetry. Design broadens perception, magnifies experience, and enhances vision. Design is the product of feeling and awareness, of ideas that originate in the mind of the spectator.”

Intensive Film Workshop
Grades 9–12 | PERIOD 1

This course is for students interested in making a serious commitment to expressing themselves through the motion picture. This intensive program leads students through an exploration of each aspect of filmmaking, from the conception of an idea to the final steps in editing. The course is segmented to include film development, pre-production scheduling, production, and editing. Students explore the genre of the fiction film, studying the styles and techniques of various filmmakers. Projects are produced using some of today’s most technologically advanced materials and systems, available on campus in the Polk-Lillard Electronic Imaging Center. Students gain a greater film/video vocabulary as well as a technical background allowing them to continue with filmmaking.

Studio Art
Grades 9–12 | PERIOD 2

Do you want to become a better artist? Would you like to create a body of quality artwork that can be used later in a college portfolio? Learn the tools of the studio artist. Through study of the elements and principles of design, students will create various works of art using a variety of media. Techniques in painting, drawing, printmaking, and computer design are the course’s primary focus. Classic subjects such as portraits, still lifes, landscapes, and the figure will comprise much of the subject matter in this class. Students will watch art films and visit local galleries to supplement the curriculum.

Web Design and Advanced Computer Graphics
Grades 9–12 | PERIOD 1

Cross-listed under Computer Science. See full course description under Arts—Visual and Performing.
COMPUTER SCIENCE

Introduction to Programming
Grades 9–12 | PERIOD 2

This course provides an introduction to computer programming for students with no previous programming experience. Students explore the basics of computer programming while creating animations, games, and simulations. Topics include object-oriented programming, variables, decisions, events, and the basics of game design in a graphical environment. Students do not need a strong high school math background, making this an ideal course for younger students. Though the course is not taught with a traditional programming language, all concepts can be transferred to other object-oriented languages, such as Java and Visual Basic.

Programming in Java
Grades 9–12 | PERIOD 1

Intended as an introduction to computer programming using traditional coding methods, this course emphasizes methodology, algorithms, data structures, code style, and the Java programming language, as suggested by the College Board for the Advanced Placement (AP) Computer Science exam. Students learn to design and implement computer-based solutions to a variety of problems. In addition, students design programs that are expandable and understandable, and they learn how and when to write code that is reusable. Although this is not an official AP course, students are exposed to most of the topics covered on the AP Computer Science exam and will learn how to create small, structured programs using the Java language.

Prerequisite: completion of Algebra II

Robots: Design! Build! Program!
Grades 9–12 | PERIOD 1 and PERIOD 2

Welcome to the world of competitive robotics. Science, math, engineering, creativity, and logic are combined in this exciting introductory robotics and robotics programming course, cross-listed under Science. Students will be introduced to the upcoming season of the Vex Robotics Competition, a world-wide competition engaging students in more than 30 countries. Using the new V5 Robot Brain, V5 Controller, Vex Robotics System, and Vex Coding Studio, students will work in teams to design, build, and program robotic solutions to the new season of Vex Robotics Competition. Teams test their solutions to the challenge, on "game day", giving beginners and seasoned roboticists alike the experience of being on a development team for competitive robotics.

Web Design and Advanced Computer Graphics
Grades 9–12 | PERIOD 1

Cross-listed under Computer Science, this course introduces students to the fundamentals of design on the computer and concentrates on software programs to enhance their skills. Using the computer as a creative tool, students blend photography, type, sound, video, animation, and interactivity. While studying various artists who utilize different media to understand the elements of design, students develop computer skills to express themselves visually. Students work on various projects, creating digital collages, a short movie, and a website that incorporates animation and sound.
**Contemporary Authors**  
*Grades 9–12 | PERIOD 1*

This course offers students the opportunity to develop an in-depth understanding and appreciation of a range of different writers. It focuses on students’ abilities to read novels, plays, short stories, and/or essays actively and to write artfully. This critical reading and writing course challenges students to confront a variety of written and visual texts and encourages them to see writing as a valuable tool. It helps them see themselves as independent thinkers and teaches them how to give voice to their thoughts through the written word. A variety of books and authors will be examined.

**Digital Journalism**  
*Grades 9–12 | PERIOD 2*

This course is for students who want to explore the intersection between storytelling, technology, and traditional reporting. Students will engage a variety of digital platforms—from social media to podcasts to online magazine articles—to develop stories that engage both reason and emotion. Daily reading and writing exercises will help students expand their repertoire of rhetorical strategies, learn to analyze audiences, and determine which digital platforms are most appropriate for various situations. Students will gain experience in field reporting and conducting research, and they will build a digital portfolio of work over the course of the program.

**Literature in Translation**  
*Grades 10–12 | PERIOD 1*

This course includes a close study of representative works of world literature. This course emphasizes the study of the literary, cultural, and human significance of selected great works of the Western and non-Western literary traditions. An important goal of the class is to promote an understanding of the works in their cultural/historical contexts and of the enduring human values which unite the different literary traditions, as well as encourage students to bring their own cultural experiences to bear on the texts. The course gives special attention to critical thinking and writing within a framework of cultural diversity as well as comparative and interdisciplinary analysis.

**Preparation for the TOEFL**  
*Grades 9–12 | PERIOD 2*

The purpose of this class is to help students improve their performance on the Test of English as a Foreign Language (TOEFL), allowing non-native English speakers who chose to enroll in the Upper School instead of the ELL program the opportunity to take a TOEFL preparatory course. Four different means of language skill acquisition and improvement are utilized: reading, writing, listening, and speaking. After a general introduction to the test format, each section of the TOEFL (Listening Comprehension; Written Expression and Speaking Ability; and Reading Comprehension) is considered in detail. Working individually and in groups, students read selections from various contemporary sources and practice extensively in a test preparation text. This course is designed for high-intermediate–level students whose goals include studying at a U.S. college or university.

**Screenwriting**  
*Grades 9–12 | PERIOD 1*

This class serves as introduction to the craft of cinematic writing. Screenwriting rewards risk-taking and finding your own personal voice; through in-class workshops, rapid writing prompts, and long-form assignments, students will develop this voice by exploring the concepts of character, dialogue, dramatic conflict, and narrative structure. By also exploring and analyzing plays by professional playwrights and screenwriters, students will gain an understanding of the variety of voices producing plays in the cinema today. The capstone project of the class will be a ten-minute screenplay written by each student.

**Speech and Debate**  
*Grades 10–12 | PERIOD 1 and PERIOD 2*

In a survey, 3,000 Americans were asked what they dreaded most. Public speaking came in first—ahead of death! In an encouraging classroom atmosphere, students are taught to improve both the delivery and the content of their public speaking. Students write, revise, and speak extensively and are introduced to competitive high school speech activities, such as extemporaneous speaking, impromptu speech, and Lincoln-Douglas debate. Close analysis of contemporary American political speeches and research of controversial topics such as the death penalty, abortion, and gun control provide issues for classroom debate. Students develop an invaluable skill that will serve them for the rest of their
lives. This course assumes no prior knowledge of public speaking or debate.

**Writing for Success: Creative Writing**  
*Grades 9–12 | PERIOD 1 and PERIOD 2*

This course is for students who think of writing as an art, not just a useful skill. Students read and write in several genres—short story, poetry, and nonfiction memoir—using the readings as models for their own work. In their writing, students are expected to develop mastery of fundamental techniques of good writing, from basic grammar and usage to metaphorical language and plot structure. Required to write daily, revise, and produce polished final drafts as well as share in class, students begin to transform raw talent into true skill.

**Writing for Success: Expository Writing**  
*Grades 9–12 | PERIOD 1 and PERIOD 2*

The most important writing course students will ever take and the most sought-after writing course at Andover, Writing for Success emphasizes essay composition as a craft and exposes students to different uses and combinations of rhetorical modes, including definition, description, narration, process, comparison, and analysis. Over the course of the program, students practice constructing effective sentences and paragraphs to suit a variety of topics, audiences, and aims. By writing every day as well as reading and discussing the style and mechanics of published essays, students experience writing as a rewardingly rigorous, recursive, and creative process that involves brainstorming, planning, composing, editing, reverse outlining, and constructive peer review.

**Writing for Success: Literary Analysis**  
*Grades 9–12 | PERIOD 1 and PERIOD 2*

This course offers students the opportunity to develop an in-depth understanding and appreciation of a range of different writers. It focuses on students’ abilities to read novels, plays, short stories, and/or essays actively and to write articulately. This critical reading and writing course challenges students to confront a variety of written and visual texts and encourages them to see writing as a valuable tool. It helps them see themselves as independent thinkers and teaches them how to give voice to their thoughts through the written word. A variety of books and authors will be examined.

**Writing for Success: Reading Images**  
*Grades 9–12 | PERIOD 2*

The twenty-first-century world is saturated with images. They fill our homes, surround us in public spaces, and decorate our bodies. We are active consumers and producers of an increasingly digital visual culture, as we click, upload, like, and share. But what do all of these pictures mean? How are we to understand our encounters with the visual world and communicate them to others? In this critical writing course, students acquire an essential set of skills known as visual literacy, as they learn to read and write about popular visual media and objects at the Addison Gallery of American Art. Each week focuses on a new way of looking closely and translating those observations into analytical, persuasive, or research-based writing. Students will leave the course with a portfolio of essays that showcases their ability to ask critical questions, evaluate texts and contexts, and communicate their meaning in writing.

**Writing the College Essay**  
*Grades 10–12 | PERIOD 1 and PERIOD 2*

This course will move students through the brainstorming, drafting, and revision process to create a set of polished essays that can be used during the college application process. Focusing on the prompts released by the Common Application as well as addressing common short-answer questions, this course will support students in creating essays that represent their individual personalities and ambitions. Students will be required to write daily, participate in workshop activities and critiques, and reflect on their own life experiences.
ENGLISH LANGUAGE LEARNING INSTITUTE

Courses listed on this page are available only to students applying for the Upper School: ELL program.

ELL Core Course
Grades 9–12 | PERIOD 1

First period course sections of ELL are divided into levels according to the results of a placement process that includes an exam and an interview shortly after arrival. Classes are offered to meet the needs of students who are highly proficient in English as well as those who need more practice and support. (A beginner-level course is not offered; students should have scored above 450 on the paper-based TOEFL, above 133 on the TOEFL CBT, or above 45 on the TOEFL iBT.) While all classes stress the development of competencies in the skills of reading, writing, listening, and speaking, close attention is paid to individual needs. Students are exposed to a wide variety of English materials and are expected to understand and respond to course materials that include, but are not limited to, American literature–based texts across a broad range of genres, films, articles, and nonfiction. Classes are small (typically 12 students) and highly interactive. It is not unusual to find eight or more cultures represented in any given group.

ELL: A Multimedia Approach to American Culture
Grades 9–12 | PERIOD 2

This intermediate/advanced course takes a close look at American culture through important historical events and documents of popular culture. Various media are investigated to gain a more complete understanding of the United States and its people. We examine American newspapers and see the United States through a number of films that focus on specific themes in American culture. Students should be comfortable expressing themselves in both written and spoken English.

ELL: Preparing for the TOEFL
Grades 9–12 | PERIOD 2

The purpose of this class is to help students improve their performance on the Test of English as a Foreign Language (TOEFL). Four different means of language skill acquisition and improvement are utilized: reading, writing, listening, and speaking. After a general introduction to the test format, each section of the TOEFL (Listening Comprehension; Written Expression and Speaking Ability; and Reading Comprehension) is considered in detail. Working individually and in groups, students read selections from various newspaper and magazine sources and practice extensively in a test preparation text. This course is designed for high-intermediate–level students whose goals include studying at a U.S. college or university.

ELL: Speak Up!
Grades 9–12 | PERIOD 2

In this ELL course, students engage in a variety of exercises to improve their proficiency in conversational English. Discussions, role-play skits, poetry, debates, and extemporaneous and prepared speeches place students at the center of the learning process and expand both the breadth and depth of their spoken English. In order to increase students’ comfort in a broad range of situations, topics for the various activities range from the mundane to the profound. Some exercises revolve around practical everyday situations, while others involve discussing topics on a deeper intellectual level. Students are challenged to employ new vocabulary, converse using complex sentence structures, and express difficult ideas. They work on pronunciation skills. Recognizing the key role of listening in any meaningful conversation, the course also focuses extensively on listening skills. This course is designed for students who are not comfortable speaking with native speakers of English and/or those who have not had many opportunities to speak English.

ELL: Writing, Presenting, and Defending Your Work
Grades 9–12 | PERIOD 2

Reading, writing, and speaking fluently in complex academic English are essential skills in which any advanced ELL student needs to excel. This course is designed to give students the analytical reading and writing skills required for success in the pre-university scholastic environment. Assignments involve researching various topics, composing papers, and extensive presenting and defending of oral arguments. At the end of this class, students will have successfully defended their oral presentations to the class on numerous occasions and developed the skills to confidently speak before the class in English in an academic setting.
HISTORY AND SOCIAL SCIENCE

Great Issues and Controversies of the Modern World
Grades 10–12 | PERIOD 2

This course takes an in-depth look at important global issues by using the critical skills of reading, writing, and analysis to view a specific topic as well as utilizing on-campus resources such as the Peabody Museum of Archaeology and the Addison Gallery of American Art. Students improve their writing skills through exams, essays, and papers; their speaking skills through in-class discussions; and their analytical skills through readings and debates. They not only increase their knowledge of contemporary issues, but also sharpen the learning tools that are necessary in any discipline. The overarching goals are to learn more about the world, apply the material to improve their skill objectives, and continue to follow world events beyond this Summer Session course.

History of Terrorism
Grades 9-12 | PERIOD 2

From the assassination of Archduke Franz Ferdinand, which lead to WWI, to 9/11, which lead to the current wars in Afghanistan and Iraq, terrorism has helped to shape the modern world. Almost every country has experienced terrorism, and the topic commands headlines and political campaigns. This course is designed to look at the past and present of terrorism, and to help students understand what terrorism is, why it exists, and where the world should expect to see terrorist acts in the future. Students will learn about the history of terrorism, will study the groups and major campaigns of the past 200 years, and will use current events to better grasp this complex topic. This course will be reading and writing-intensive as well as use student-led discussions. This is an intense topic, and some of the material will be upsetting. However, knowledge is the only way to confront terrorism, and students will leave this course better able to understand the world they live in, and events to come.

Law and Society
Grades 9-12 | PERIOD 1 and PERIOD 2

In this course, students will learn about the foundations of the American legal system and how they apply to social, economic, political, and individual issues. We will delve into issues of law, crime prevention, conflict resolution, advocacy, and human rights through a combination of case studies, legal analyses, and mock trials. This class will study several landmark cases from the American legal system's history and explore their impact on our society, while considering how the precedents set in these cases apply to current issues. If you love discussion, if legal issues intrigue you, if you’re thinking about studying law, or if you just want to look at society from a new point of view, this is the class for you.

Medicine and Society
Grades 9–12 | PERIOD 1

The coronavirus pandemic of 2020 has offered a harsh reminder of how much societies around the world depend on medicine. At the same time, it has underscored the ways in which medical challenges—from disease and its treatment to healthcare access—are intricately connected to social values, assumptions, and structures. To make sense of the contemporary moment, therefore, we must ask why there are disparate experiences of an infectious disease among different social groups; how the epidemiological origins of that disease can shape social perceptions of people and places; and how a medical crisis can shape social (r)evolutions, such as widespread calls for racial justice. Students will apply this critical and international perspective to the relationship between modern medicine and society by exploring important case studies in public health and reflecting on their own experiences of health care. Together we will analyze representations of medicine in non-fiction, short stories, news reports, popular media, film, and art. These sources, along with field work on the Andover campus, will inspire students’ critical essays and personal narratives.

Money, Economy, and Society
Grades 9–12 | PERIOD 1 and PERIOD 2

Our lives are impacted by economic forces in surprising and powerful ways. Learn to appreciate these forces and you’ll make smarter personal decisions and better sense of the world around you. What constitutes a “fair price” when you purchase a new iPhone? Why is LeBron James paid forty million dollars a year to play basketball when a nurse or firefighter is paid forty thousand dollars a year to save human lives? Is it possible to bring manufacturing jobs back to America by placing tariffs on Chinese imports? Can we reduce income inequality by taxing the rich and writing checks to the poor? Why is a stay-at-home-mom who cares for her children and cleans the house classified by
To answer these and many more questions, we trace the main currents of economic thought from Adam Smith and Karl Marx to Marilyn Waring and Thomas Piketty.

**Personal Finance**  
*Grades 9–12 | PERIOD 1 and PERIOD 2*

Cross-listed under Mathematics, this course aims to develop students’ financial literacy skills, emphasizing real-world applications of mathematics in the areas where students will need to be most skilled when they become financially independent. Budgeting, learning to borrow and invest wisely, understanding the stock market and basics of investing, and planning for major purchases and life events will all be covered. Through a combination of reading, research, simulation activities, projects, and data analysis, students will learn to prepare for their financial futures.

*Prerequisite: successful completion of one year of algebra.*

**The Politics of Migration and Displacement**  
*Grades 10–12 | PERIOD 1*

More people than ever flee political conflict and persecution, poverty, and climate change-related disasters. In search of livelihoods and safety, migrants find themselves at risk of becoming victims of smugglers or traffickers. In light of an ongoing humanitarian focus on issues of displacement and migration, this course will provide students with historical background and relevant context through an academic lens. Students gain an enhanced understanding of the complex interaction between migration and humanitarian interventions from multiple points of view, including migrants, host communities, hosting authorities, and the humanitarian sector. Students will engage with academic material about the history of humanitarian responses to displacement; drivers of migration; durable solutions; among other topics. They will also learn from migration theory and case studies depicting situations of displacement around the world.

**Psychology: Current Issues**  
*Grades 9–12 | PERIOD 2*

The goal of this course is to introduce students to the fundamental concepts, theories, and branches of psychology. Through a combination of student-centered activities, readings, discussions, and contemporary films, we investigate topics such as adjustment, personality traits, psychological disorders, and group dynamics. Students also explore psychological ideas that are directly relevant to their adolescent experiences, such as developing healthy relationships and identity formation. No previous background in psychology is required.

**Social Psychology**  
*Grades 9–12 | PERIOD 1*

This course is an introduction to the theories and applications of social psychology in research, academic and social settings. Through class activities and discussions, students experience and reflect on constructs of social psychology that they will have read about in scientific settings. Students are also involved in discussing the relevance of gender and ethnic diversity in the construction of social values, with specific focus on their own lives and experiences. Topics include group dynamics, conformity, self-knowledge, attitude formation and change, interpersonal attraction, prejudice, and aggression.
**MATHEMATICS**

*Students requesting a math course will be required to take an online placement exam to assess math level & ability*

### Calculus*
**Grades 10–12 | PERIOD 1**

This course is for students who have successfully completed two years of algebra and a yearlong precalculus course that includes trigonometry. It is an accelerated mathematics course for strong math students and covers many of the topics in the Advanced Placement curriculum, including limits and continuity, derivatives and their applications, indefinite and definite integrals, techniques and applications of integration, and the Fundamental Theorem of Calculus.

**Prerequisite:** successful completion of two years of algebra and one year of trigonometry

### Geometry*
**Grades 9–12 | PERIOD 1 and PERIOD 2**

For students who have had a strong elementary algebra course but no geometry, this course is a thorough study of the fundamentals of geometry. The development of logical, structured proofs and deductive reasoning is emphasized. Along with numerical solutions to problems, topics include basic postulates of geometry, lines and angles, congruent triangles, parallel lines in the plane and in space, quadrilaterals and polygons, circles, similar triangles and other figures, and the Pythagorean Theorem.

**Prerequisite:** a yearlong course in elementary algebra

### Personal Finance
**Grades 9–12 | PERIOD 1 and PERIOD 2**

This course is cross-listed. See full course description under History and Social Science.

### Statistics*
**Grades 11 and 12 | PERIOD 1**

This course covers the exploratory analysis of data, making use of graphical and numerical techniques to study patterns and developing plans for data collection of valid information. Topics include probability as the tool for producing models, random variables, independence, normal distribution, simulation, sampling, statistical inference, confidence intervals, and tests of significance.

**Topics in Algebra**
**Grades 9-10 | PERIOD 2**

This course reviews and reinforces math skills found in the pre-algebra and Algebra I curriculum. It should provide a solid foundation for Algebra II and Intermediate Algebra. Topics include several fundamental concepts of Algebra, graphing and solving linear and quadratic functions, solving systems of linear equations and properties of exponents.

**Prerequisite:** successful completion of a year of algebra

### Topics in Intermediate Algebra*
**Grades 10 and 11 | PERIOD 2**

This course reviews and reinforces math skills found in the Algebra II curriculum. It should provide a solid foundation for pre-calculus. Topics include solving linear equations and inequalities and absolute value equations and inequalities. A study of linear functions will be followed by polynomials and rational expressions. An in-depth study of quadratic functions may be followed by exponential and logarithmic functions, time permitting.

**Prerequisite:** successful completion of a year of algebra

### Topics in Advanced Algebra and Precalculus*
**Grades 11 and 12 | PERIOD 1**

This course focuses on pre-calculus topics, which are prerequisites for calculus and necessary for success in subsequent mathematics courses. Topics covered will include linear systems of equations, linear functions, quadratic functions, polynomial functions, logarithmic functions, and radical functions. Additional topics may include sequences and series, counting and probability, matrices, and partial fractions. A graphical calculator will be used in class, enabling students to gain both a graphical and an algebraic understanding of concepts.

**Prerequisite:** two years of algebra

### Trigonometry*
**Grades 10–12 | PERIOD 2**

This course offers a comprehensive study of circular and trigonometric functions. Topics include radian measure, trigonometric equations, solving right triangles, graphing trigonometric functions, inverse trigonometric functions, law of sines, and law of cosines. Trigonometry will be used to model real-life applications.

**Prerequisite:** one year each of algebra and geometry
PHILOSOPHY & RELIGION

**Introduction to Philosophy**  
*Grades 10–12 | PERIOD 1*

Philosophy has been around for a long time, but what is it? This course is for anyone who has ever wondered what philosophy is about, as well for those who would like to deepen what they may already know about it. Everyone thinks, but not everyone thinks philosophically. Over the millennia, philosophers have come up with questions, ideas, and methods that allow us to look beneath the surface of things, examine our preconceptions, and gain new insights about ourselves and the world we live in. This course is about what it means to do this. We will watch philosophical films and read the works of many famous philosophers like Plato, Aristotle, René Descartes, John Locke, and Immanuel Kant. We will also take a field trip to Walden Pond, where Henry David Thoreau, one of America’s great thinkers, conducted a famous philosophical experiment. Most of all, we will think, talk, and have fun exploring the fascinating world of ideas.

**Justice and Ethics**  
*Grades 10-12 | Period 2*

Few ideas have been more powerful in human history than the idea of justice. This idea has been central to the ways that human societies function and think of themselves—not just governments and legal systems but also religious communities, social movements, and individuals. Though the quest for justice is one of humanity’s oldest aspirations, it remains a powerful ideal today. In this course, we will examine the idea of justice in connection with the human quest to live a morally worthy life. We will look first at the origins of justice in classical thought and in long-standing religious traditions. This will help us to understand how and why people today conceptualize—and argue about—justice in the way that they do. In the second half of the course, we will use concepts in moral philosophy to consider the ethical backgrounds of environmentalism, human rights theory, and contemporary social justice movements.
**SCIENCE**

**Anatomy and Physiology**  
*Grades 11 and 12 | PERIOD 1*

This course focuses on the anatomical and physiological workings of the human body. Among the anatomy and physiology topics introduced are histology, kinesiology, cardiology, and genetics. Students learn to identify anatomical structures and their functions in relation to daily bodily activities. Student work is assessed through written reports, examinations, lab practicals based on dissection, and research topics. Students have the opportunity to leave this course with their own portfolio materials that are focused on topics introduced in the class setting.

**Applied Physics: Astronomy**  
*Grades 9–12 | PERIOD 1*

Modern astronomy is a quest for a greater understanding of the evolution and diversity of the universe, as well as an application of critical thinking skills to broader questions in physics, chemistry, biology, and environmental science. This class examines the current state of the science as well as future avenues of research and discovery. Topics include traditional areas of emphasis, such as the electromagnetic spectrum, light, telescopes, navigating the night sky, solar system formation, the planets, global climate change, comets and asteroids, the sun, and the lifecycle of stars. We also apply a critical analysis to the broader questions that include the search for life in the universe and connections to life on this planet. We keep a close eye on current research and examine the history of science through the eyes of non-conventional thinkers, including Einstein and Galileo. Last, we examine some of the more exotic subjects that are stretching the limits of modern science, such as black holes, ion propulsion, dark energy, and life in extreme environments. We make use of the extraordinary imagery and resources available here at Phillips Academy, including the state-of-the-art observatory in Gelb Science Center. Throughout the session, students engage the science critically and capture a snapshot of this emerging field of science.

**Astronomy: The Planets and Space Exploration**  
*Grades 9–12 | PERIOD 2*

This course looks at the planets and the exploration of the solar system from the perspective of the past 50 years of human spaceflight. By making use of the rich array of images returned from the moon, Mars, and beyond, students explore and critically analyze these worlds in the context of their geologic evolution and the search for extraterrestrial life. The class examines the processes that have shaped the planets and moons of our solar system. Students explore the fundamentals of geology and meteorology on Earth and apply them to the rest of the solar system. Critical thinking is stressed in the context of comparative planetology. This class specifically looks at the formation of the solar system, the history of space exploration, missions to the moon and Mars, and the search for life.

**Biology: First Year**  
*Grades 9–12 | PERIOD 1*

This is an intensive introductory lecture, laboratory, and field course designed to investigate and explore biological concepts and principles. Units covered include ecology, plant biology, animal diversity, concepts of animal structure, and cellular biology. Scientific writing also is emphasized. The framework of the course is a student’s conceptual understanding of biology; however, an emphasis is placed on biology as a process rather than an accumulation of facts.

**Biology: Prep for Advanced Placement**  
*Grades 10–12 | PERIOD 2*

Biology: Prep for Advanced Placement is a pre-AP course designed to introduce students to the rigor of a college level laboratory course in general biology. The framework of the course is a student’s conceptual understanding of biology. However, an emphasis is placed on biology as a process, rather than an accumulation of facts. Laboratory work and skills in scientific writing will be developed. A few of the units students will cover include: Writing in Biology, Membrane Structure and Function, The Cell Cycle, Transport in Plants, and Animal Behavior.

*Prerequisite: successful completion of one year of biology*
Chemistry: First Year
Grades 10–12 | PERIOD 1

This course is geared toward highly motivated students who show an interest in science and have demonstrated strong mathematical and conceptual abilities. As an introduction to chemistry, this intensive course teaches students essential chemical principles, such as stoichiometry; atomic and molecular structure; chemical bonding theories; and the properties of gases, liquids, solids, and solutions. The very fundamental concepts of chemical equilibrium and acid-base chemistry also are presented, and students are introduced to the topic of electrochemistry. The course is balanced by a combination of lectures, problem-solving exercises, and laboratory work, providing a strong foundation in chemistry.

Requirement: Texas Instruments TI-84 graphing calculator or its equivalent

Prerequisite: successful completion of one year of algebra

Chemistry: Prep for Advanced Placement
Grades 10–12 | PERIOD 2

This course is intended for highly motivated students who are getting ready to take an AP Chemistry course and have demonstrated strong mathematical and conceptual abilities. Students review essential chemical principles, such as stoichiometry; atomic and molecular structure; chemical bonding theories; and the properties of gases, liquids, solids, and solutions. The very fundamental concepts of chemical equilibrium and acid base chemistry also are presented, and students are introduced to the topic of electrochemistry. The course is balanced by a combination of lectures, problem-solving exercises, and laboratory work. Utilizing a college-level textbook, the course covers topics at a depth equivalent to that of an introductory college chemistry course.

Requirement: Texas Instruments TI-84 graphing calculator or its equivalent

Prerequisite: successful completion of one year of algebra and one year of chemistry

Environmental Science
Grades 9–12 | PERIOD 2

Climate change, species extinction, devastating tropical storms, and nuclear disasters—all of these topics and more will be explored through our introduction to the interdisciplinary field of environmental science and social justice. Students learn scientific methodology through hands-on biology- and ecology-based lab investigations using the 500-acre Phillips Academy campus as well as the rich diversity of ecosystems within a short drive of the school. Students also will use class time and field work to study the environment in terms of history, social context, economics, and sustainability. Students will identify and analyze environmental problems (both natural and human-made) and examine possible solutions for resolving and/or preventing them.

Genetics
Grades 10–12 | PERIOD 1

This rigorous course studies the profound implications of recent advances in genetics. It will begin with a review of the structure and function of DNA in addition to the basics of Mendelian genetics. Further exploration of the topics will lead to a deeper understanding of genetic diseases, cancer, evolution, and the new field of epigenetics. The course considers methods of detecting genetic defects and genetic engineering, and includes discussions of the ethical implications of both. A significant portion of this course will include work in the lab with a variety of techniques.

Prerequisites: successful completion of one year of biology and one year of chemistry

Marine Biology
Grades 9–12 | PERIOD 2

Students are introduced to several different aspects of marine biology through lectures, laboratory investigation, and field trips. Topics include, but are not limited to, oceanography, marine invertebrate and vertebrate zoology (including physiological adaptations to a marine environment), aquaculture, and ecology of the various habitats within aquatic ecosystems. We examine the physical and chemical properties of seawater, organisms that have evolved to an aquatic environment, the physiological and behavioral adaptations those organisms have developed, and the different ecosystems within oceanic zones.

Physics: First Year
Grades 9–12 | PERIOD 2

This course covers the main ideas of mechanics and provides a solid foundation of concepts, confidence in problem solving, and exposure to laboratory techniques. Although this course does not cover a full year’s worth of material, the techniques learned serve as excellent preparation for all introductory physics topics.

Requirement: Texas Instruments TI-84 graphing calculator or its equivalent
**Prerequisite: successful completion of one year of algebra**

**Physics: Prep for Advanced Placement**

*Grades 10–12 | PERIOD 1*

This course is an algebra-based, introductory physics course, intended to prepare students for Advanced Placement. Students cultivate their understanding of physics through classroom study, in-class activity, and hands-on, inquiry-based laboratory work as they explore concepts like systems, fields, force interactions, change, conservation, and waves. By confronting complex physical situations or scenarios, the course is designed to enable students to develop the ability to reason about physical phenomena using important science practices, such as explaining relationships, applying and justifying the use of mathematical routines, designing experiments, analyzing data, and making connections across multiple topics within the course.

*Prerequisites: successful completion of one year of algebra and one year of physics*
Afternoon Activity Offerings
Grades 9-12

- Basketball (offered at both the Beginner/Intermediate and Intermediate/Advanced levels)
- Cardio Kickboxing
- Dance (offered at both the Beginner/Intermediate and Intermediate/Advanced levels)
- Fitness
- Flag Football
- Hiking
- Power Walking
- Running
- Soccer (offered at both the Beginner/Intermediate and Intermediate/Advanced levels)
- Spinning
- Squash
- Swimming (supervised lap swimming offered at both the Intermediate and Advanced levels. No beginner swim instruction is offered)
- Tennis (offered at both the Beginner/Intermediate and Intermediate/Advanced levels)
- Ultimate Frisbee
- Volleyball (offered at both the Beginner/Intermediate and Intermediate/Advanced levels)
- Yoga/Pilates

Optional Additional Offerings
Grades 9-12

- College Counseling
- Essential Study Skills course
- Music Lessons
- ACT, SAT or SSAT Preparation course (Princeton Review)

*Fees associated with optional additional offerings are detailed on the Andover Summer website*