COMMONWEALTH
SCHOOL

ACADEMIC CATALOG

"Commonwealth has made me think more deeply about what I've been learning and therefore about the world in general.... It is not about finding an answer but reaching a greater understanding."

Contents

EXPERIENCE ACADEMIC ELECTRICITY

Have you ever walked out of a classroom with a buzzing in your brain? A thrill running down your spine? A sense that you've been changed—forever and in the most fantastic way—by what you've just learned? If you have, you've probably searched for that feeling at school every day since. If you haven't, you will at Commonwealth School.

Whether you're learning about the notoriously unsolved P vs. NP computer science problem, the role of resurrection in the poetry of Eudora Welty, the atomic origins of color, the history of *commedia dell'arte* theater, or the mathematical underpinnings of infinity, you'll find an invigorating intellectual atmosphere at Commonwealth, forged by curious, intelligent students working with outstanding teachers. Together they revel in shared academic enthusiasm and embrace the complexity and nuance inherent in deep studies, as students read, write, and reason at the college level. Yes, the academic demands are high, but teachers and advisors keep careful watch over student progress and spend much of their time working one-on-one with them to offer support and enrichment.

If you, too, yearn to wrestle with big ideas and look closer at small details, all alongside students who share your zest for learning, keep reading to get a sense of what Commonwealth classes entail. Please note that not all courses are offered every year. We encourage you to reach out to us at admissions@commschool.org with any questions you might have.

THE NINTH-GRADE EXPERIENCE

"I think the biggest thing about Commonwealth academics is that you learn to go out of your comfort zone. Now I can't wait to learn about a new line of poetry in English or something in the past from ancient history or cell biology. All of those are things that I would have never wanted to go to as much as math in my middle school."

Entering a rigorous high school is exciting and fun. But like any new venture, it also requires adjusting to new classes, new teachers, and a new culture. At Commonwealth, we have designed a first year aimed at helping you settle in, make friends, and learn how to do your best work as soon as possible.

Advisor and Student Buddy

Even before you set foot inside the school as a new student, you are assigned an advisor and a student buddy. Both will get in touch with you during the summer, and once school starts, you will meet regularly with your advisor one on one. They will answer your questions, offer support, or simply take time to chat. After the first semester, when you have gotten to know all your teachers, you have the opportunity to indicate your preferences for a permanent advisor.

Study Hall

During your first semester here, you will spend your free periods in study hall. This arrangement provides structure and encourages you to focus and use your time productively. It also gives you easy access to teachers if you become snarled in a homework assignment.

Pass-Fail Grading

We want you—and your families—to understand that if you learn to welcome academic challenge, feel free to join in lively class discussions, seek out your teachers when you feel the need, and carefully read their comments on your written work—in short, if you engage fully with your studies, your grades will take care of themselves. To this end, though teachers give grades (and write you lengthy comments) to help you assess your progress, at the end of ninth-grade year, your final letter grades convert to a P (pass) or an E (fail) on your transcript.

Ninth-Grade Seminar

All ninth graders take a special year-long seminar designed to prepare them to succeed throughout their time at Commonwealth, including how to:

- Communicate effectively and respectfully, particularly in a digital world
- Navigate Boston comfortably and conscientiously (our "City of Boston" unit, replete with field trips around the city and challenging questions)
- Study and plan their time effectively
- Safeguard their health and wellness by examining crucial questions about "growing up" and all that it entails (our "Health and Community" unit)

SAMPLE NINTH-GRADE SCHEDULE

Our building opens at 7:30 a.m., and our day begins at 8:30 a.m. We can stay until 5:00 p.m. or leave earlier once our activities are done.

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
FRENCH 2	Study Hall	BIOLOGY 1	ANCIENT HISTORY	COMPUTER SCIENCE 1
ANCIENT HISTORY	FRENCH 2		Assembly	BIOLOGY 1
Recess	Recess	Recess	Recess	Recess
Study Hall	Class Meeting	Advisor Meeting	9TH GRADE SEMINAR	FRENCH 2
GEOMETRY ADVANCED	BEGINNING PHOTOGRAPHY	ENGLISH 9	BIOLOGY 1	ANCIENT HISTORY
BIOLOGY 1	ENGLISH 9	ANCIENT HISTORY	Study Hall	Lunch Setup / Study Hall
Lunch + Model UN	Lunch	Lunch + Math Team	Lunch	Lunch
ENGLISH 9	9TH GRADE SEMINAR	COMPUTER SCIENCE LAB	BEGINNING PHOTOGRAPHY	GEOMETRY ADVANCED
COMPUTER SCIENCE 1 2:45 p.m.		GEOMETRY ADVANCED 2:45 p.m.	FRENCH 2	ENGLISH 9 2:45 p.m.
Soccer Practice 3:00–5:00 p.m.	GEOMETRY ADVANCED 3:25 p.m.	Soccer Practice 3:00–5:00 p.m.	Study Hall 3:45 p.m.	Soccer Game 3:00–5:00 p.m.
	Play Rehearsal 3:30–6:00 p.m.		Play Rehearsal 4:00–6:30 p.m.	

CLASSES MEETINGS / COMMITMENTS ALL-SCHOOL GATHERINGS EXTRACURRICULAR ACTIVITIES ATHLETICS

GRADUATION REQUIREMENTS

By the time you graduate from Commonwealth, you will feel amply prepared for whatever comes next. The standard course load is five academic credits and one or two half-credit art courses per year. All classes run for the entire year. You must take a minimum of four academic credits and one half-credit art course each year to remain in good standing. Our minimum graduation requirement is eighteen credits.

Progress Through the Curriculum

Because new students come to Commonwealth from many different types of schools, their training and levels of preparation for our courses vary. We use placement tests and conversations with the Assistant Head of School and teachers to develop a first-year schedule suited specifically to your needs and interests. In subsequent years, your advisor (in consultation with the faculty) will help you shape your course load.

Capstone Projects for Seniors

If you have a passionate interest in a particular subject, have proven yourself engaged and self-motivated, and are reliable with deadlines, you will have the opportunity to apply for a year of independent study under the guidance of a faculty mentor through Commonwealth's Senior Capstone program.

Finished projects will vary, of course, according to each year's chosen topics, but by spring, all Capstone scholars produce a substantial piece of writing or art and have the exciting chance to present their year's labor and discoveries to the entire school. Applications to the Capstone Program are due in spring of junior year during course registration; accepted candidates will begin research and correspond with mentors during the summer.

	GRADE 9	GRADE 10	GRADE 11	GRADE 12
English	English 9	English 10	English 11	English 12 or Reasons for Writing
History	Ancient History	Medieval World History	U.S. History	Modern European History or Other History Elective
Language *	Language Level 1	Language Level 2	Language Level 3	Language Level 4 or Higher
Math **	Geometry or Geometry Advanced	Algebra 2/Precalculus or Algebra 2/Precalculus Adv.	Calculus 1 or Statistics	Theoretical Calculus or Other Math Elective
Science	Biology 1	Chemistry 1 or Chemistry 1 Advanced	Physics 1 or Physics 1 Advanced	Advanced Science Elective(s)
Arts †	One or More Arts Courses	One or More Arts Courses	One or More Arts Courses	One or More Arts Courses
Grade-Specific Courses † †	Ninth-Grade Seminar	Not Applicable	Not Applicable	Head of School Seminar
Athletic Requirements	Two Seasons of Sports	Two Seasons of Sports	Two Seasons of Sports	Two Seasons of Sports
Other Requirements	Project Week, Community Service ^	Project Week, Community Service ^	Project Week	Senior Project

* **LANGUAGES:** French, Latin, Mandarin, or Spanish

** **MATH:** Representative example; students can progress through math curriculum according to their interest and ability, including upper-level courses such as Theoretical Calculus and Axiomatic Set Theory.

† **ARTS COURSES:** Acting, The Art and Science of Materials, Chorus, Chorale, Chamber Music, Jazz Ensemble, Orchestra, Ceramics, Drawing and Painting, Life Drawing, Photography, Printmaking, Sculpture

† † **GRADE-SPECIFIC COURSES:** Ninth-grade seminar teaches students how to communicate effectively, how to navigate Boston comfortably and conscientiously, and how to safeguard their health and wellness; Head of School Seminar challenges seniors to explore the role of purpose of education in the United States and more broadly.

^ **COMMUNITY SERVICE:** Progress Toward 20 Hours

"I used to read books in black and white, but three years of Commonwealth English classes have taught me to see all the colors."

ENGLISH

English 9

Reading, thinking, talking, listening. This class provides the foundation for your four years of Commonwealth English classes: you learn how to read with sustained attention—to listen carefully to the particular language of a text, to perceive its impact, and to express what you have discovered in short, well-constructed essays. In class discussion, you work with your classmates on trying out and refining your ideas about a reading. You get plenty of practice writing—and plenty of feedback, too—with frequent one- to two-page analytical essays; sometimes you will have the opportunity to imitate or parody distinctive styles of writing. Texts may include *The Iliad* or *The Odyssey* (dovetailing with the ninth-grade Ancient History course); Shakespeare, *Much Ado About Nothing*, *Romeo and Juliet*, or *Julius Caesar*; Brontë, *Jane Eyre*; Dickens, *A Tale of Two Cities*; Twain, *Huckleberry Finn*; Thomas, *Under Milk Wood*; Naipaul, *Miguel Street*; Rhys, *Wide Sargasso Sea*; Kingston, *The Woman Warrior*; Dillard, *An American Childhood*; and a smorgasbord of folktales, short poems, and stories.

English 10

The plot thickens! As a tenth grader, you will refine your skills as a literary critic. You work with a variety of texts in which you encounter narrators who cannot be trusted, plays in which no character is "right," and heroes who are not necessarily sincere (or even particularly "heroic"). You learn to piece together an argument based on increasingly complicated textual evidence; close reading will help you to find your way and draw conclusions about complex matters even in the absence of a trustworthy narrator's strong helping hand. And in your essays, you'll focus on how to describe clearly the perceptions you uncover. Texts often include Shakespeare, *Macbeth* or *Richard II*; Dickens, *Great Expectations*; short stories by Hemingway, Lawrence, Mansfield, Welty, Lahiri, and others; essays by Orwell; dramatic monologues; and Hurston, *Their Eyes Were Watching God*, or Kincaid, *Annie John*.

English 11

This year is devoted to listening to the enormous expressive range of the human voice as rendered in written words. We pay increasingly close attention to diction, tone, patterns of speech, the arc of an argument—to the way so much hinges on exactly how things are said by poets, characters, and narrators. Take Shakespeare's Hamlet, whose intense urge to speak the truth drives him to express himself in a multitude of voices. We study literary works in a non-chronological order designed to allow particular voices to resonate with and build on each other. And we read at a leisurely pace, often aloud and together. We spend most of first quarter on lyric poems to sharpen your listening skills; then we move on to longer works. Focused critical essays analyzing passages help you uncover nuance and confront ambiguity. Authors include Gwendolyn Brooks, F. Scott Fitzgerald, Terrance Hayes, James Joyce, Kiese Laymon, Shakespeare, and Derek Walcott.

English 12

You are ready to consider the ways literary works relate to one another. You might, for instance, read a number of texts to see how the Romantic era in literature developed into our own. Or you might consider a theme (e.g., the search for an imagined paradise), a theoretical question (e.g., what comic or tragic possibilities are realized when things—societies, language—fall apart), or a genre or an idea (e.g., how the self is constructed in a variety of autobiographies). Each section will have its own list of readings and its own subject to pursue. Courses change from year to year according to teacher and student interests. Texts might include poetry by Wordsworth, Keats, Whitman, Dickinson, Frost,

Stevens, Moore, Plath, Bishop, Langston Hughes, and Berryman; Shakespeare plays; Milton, *Paradise Lost*; Swift, *Gulliver's Travels*; Austen, *Pride and Prejudice*; stories by Hawthorne and others; Hardy, *Tess of the D'Urbervilles*; Conrad, *The Secret Agent*; Joyce, *Portrait of the Artist as a Young Man*; Forster, *A Passage to India*; Woolf, *To the Lighthouse*; Faulkner, *As I Lay Dying*; Bellow, *Seize the Day*; and Roy, *The God of Small Things*.

English 12: Reasons for Writing

This class offers you the chance to read and then to write in a variety of forms beyond literary analysis: memoirs, journalism, science writing, and polemics on such topics as climate change. In the spring, you and your classmates will produce a *New Yorker*–like class magazine that is usually distributed to the whole school. Possible readings: a compilation of autobiographical, journalistic, persuasive, and science writing by authors such as Milton, Abraham Lincoln, Florence King, Louis Menand, and Steven Pinker; Shakespeare, *Othello*; Milton, *Paradise Lost*; Austen, *Pride and Prejudice*, or Wharton, *The Age of Innocence*; stories by Tolstoy and O'Connor; Stoppard, *The Real Thing*; and Williams, *Style: Toward Clarity and Grace*.

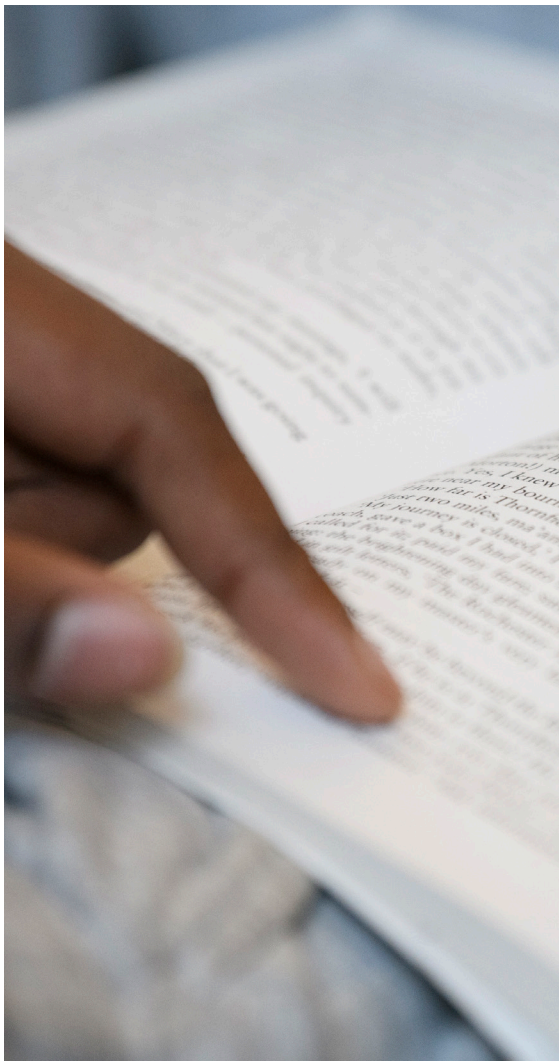
Creative Writing

Students spend the first half of the year generating a great deal of writing in a wide variety of forms (poetry, creative nonfiction). Coursework includes weekly one-page writing prompts, three- to five-page submissions for workshops, and thoughtful discussion of one another's work. Toward the end of the year, each student defines and completes an individual project to be handed in at the last class. In the past, student projects have included collections of poems, linked short stories, longer stories, and screenplays. Students may enroll in the course for a second year, to be noted on the transcript as Creative Writing 2. Open to 10s, 11s, and 12s.

Victorians and the City

What did "the city" mean to the Victorians? How did they imagine—or worry—that the relationship between self and others would change in an increasingly urbanized and industrialized society? How did writers use literature to reflect on urban challenges and possibilities? Do Victorian ideas about the city resemble our own? Students will ponder these and other questions in this course. Along with some shorter works and excerpts of poetry and prose (like Stevenson's *Dr. Jekyll and Mr. Hyde*), students will tackle Dickens' capacious masterpiece *Bleak House*, which both creates a teeming microcosm of Victorian London and provides a critique of it. We may also consider in turn how Dickens' representations of Victorian society have shaped our current ways of thinking about the Victorians and the Victorian city. Open to 10s, 11s, and 12s.

"After reading essays that were informative, elegant, shocking, and beautiful, it was my turn. In writing my personal essay for Reasons for Writing, I found my voice."



"Our history curriculum, centered on the close reading of primary sources, made it easy for me to imagine the sorrow of a Greek poet's lament in ancient history or a layperson's yearning for nirvana in the Buddhist colophons we read in Medieval History."

HISTORY

Ancient History

A shard of pottery inscribed with a drinking song; a creation myth; Persian kingship inscriptions; Athenian court cases: how can historians tell us anything about the past from such insufficient sources? By making you distrust the certainty with which textbooks lay out "facts," Ancient History at Commonwealth provides an excellent introduction to the study of history. In this course, you will use primary sources to explore the history of the Near East and Mediterranean Basin, concentrating on the period from the conquests of Alexander the Great through the formation of the Roman Empire and the birth of Christianity. Throughout the year, contact across cultural boundaries will be a major focus of our work. We will try to understand how different peoples (including Assyrians, Persians, Hebrews, Greeks, and Romans) perceived each other, and what factors led them towards cooperation or conflict. We will also explore the strategies that various empires used to establish and maintain their rule.

Medieval World History

The medieval world was an interconnected one: Chinese emperors prized ostrich eggs from Africa; African and European kings wore silks from the East. In Medieval World History, we look at how ideas (and diseases) traveled freely on the Silk Road that tied East to West in a time of rich and diverse cultures when East, rather than West, ruled the world. Primary sources allow us to look at the ways the cultures of China, the Muslim world (including Africa), and Europe viewed one another; how religions developed in response to other religions as well as political necessity; and how evolving technology and economic systems changed cultures. Though we have a textbook, created specifically for this course by a Commonwealth teacher, our main focus remains close reading and in-depth discussion of primary sources, including such classic works as Lao Tzu, *Tao Te Ching*; Dante, *Inferno*; Bocaccio, *Decameron*; the Malian epic *Sundiata*; and *The Incoherence of the Incoherence* by the Muslim philosopher Ibn Rushd.

United States History

In this course, students will trace the changing understanding of what it means to be "free" (and what role government might play in limiting or securing that freedom) from the founding of the colonies in the seventeenth century to the Reagan Revolution in the 1980s. This version is best for students looking for a grounding of our current world in the debates at the founding Republic, with the fall semester focusing on the intellectual history of the eighteenth and nineteenth century (including a focus on how slavery and debates over abolition shaped culture, politics, and economics). As with the U.S. HistorySince 1865 version of the course, this class features a research paper in the spring and—with some previewing of material—should prepare students for the AP. Summer reading assignment: William Cronon's *Changes in the Land*.

United States History Since 1865

This version of U.S. History offers an opportunity to dive deeper into the intersection of race, capitalism, and democracy in the United States by focusing on the period after the Civil War. The smaller scope of the course allows us to look at events in greater detail, offering more opportunity toexamine different types of primary sources (more film, music, cartoons) and a wider variety of scholarly articles. As with the standard version of U.S. History, the course features a research paper in the spring and—with some additional work—should prepare students for the AP. Summer reading assignment: Jill Lepore's *These Truths*.

Modern European History

We examine major themes and events in European history from the late seventeenth century through the 1990s. The questions that drive our study include What has defined "legitimate" political authority at different points in European history? How have economic and technological developments shaped political and social history? What accounts for the rise and fall of nationalism, fascism, communism, and other "isms"? When and why have European states fought each other or persecuted groups of their own citizens? Primary sources provide the basis for class discussion and for most writing assignments. Our readings also include a college-level textbook and a variety of scholarly articles. After this class, you will be prepared for advanced-level electives in modern European history in college. Students wishing to take the AP Exam in European History will need to do some additional preparation. Course intended for 12s.

"Instead of accepting the facts as presented in secondary sources, I could see for myself what really went on. Reading primary sources in history was a way to cut through the dry tone of a textbook and focus on how people actually felt and what they saw."

Empires & Nationalism

The twentieth-century world emerged from the ruins of empires. In this course, we will explore the ways in which imperial rule and its usually violent end have shaped nationalism and national conflict. We will examine the end of the Ottoman Empire and the Armenian genocide of 1915–1916, Yugoslavia from the state's formation through the post-Yugoslav wars, the end of the British Raj and the trauma of Partition in India, and Iraq's experience from the Ottomans through the present. The course will challenge students not only to understand the uniqueness of each country's history but also to think conceptually and comparatively across cases. In most weeks, students will write a response paragraph on an assigned question. The class has no tests or longer writing assignments. Open to 11s and 12s.

Bible-as-History/Bible-as-Bible

Back in the era of the great empires of the Iron Age, an Egyptian bureaucrat complained to his supervisor about bandits—*habiru*—who lived outside the imperial system in the foothills of Canaan. Millennia later, historians have begun wondering whether those *habiru* might have been the Hebrews of the Bible—and how the Bible (and archeological research) might be used to draw a picture of the radically egalitarian Israelite society. This course asks students to use their skills as readers of primary documents to uncover the competing social and religious concerns contained within a complex text where the date of completion is in question—and to use their skills as responders to language to consider the meaning of the very human questions captured in the poetry. In addition to examining the radical social nature of the religion of the ancient Israelites, we will look as well at the changing conception of God and the problem of suffering, especially as it was influenced by the Babylonian exile and the Greek influence of the Hellenistic period. The last third of the course will focus on the Jesus movement and its Jewish and Greek roots, focusing not only on the Christian Bible but also on the Gnostic texts that were excluded from the canon in the second century. Most of the writing of the course will be in the form of regular response papers, but the major final project will be an examination—or creation!—of some literary, musical, or artistic interpretation of a Biblical story. Open to 10s, 11s, and 12s, with preference given to 10s.

"Studying recent history became relevant not only because it helped me make sense of the present, but also because it made me ask who had written what I was reading and how we can come to know what is true and what is not."

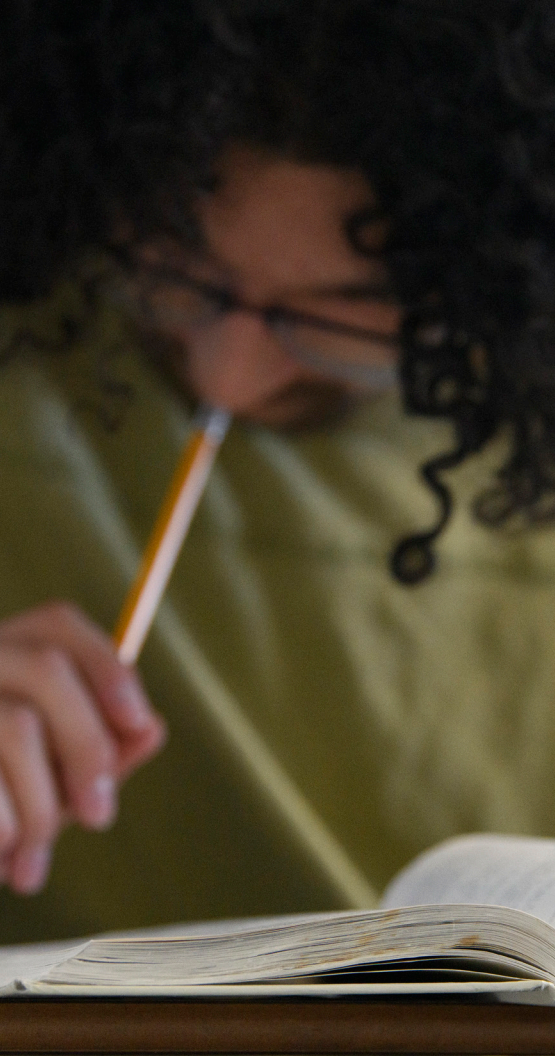
The World Since 1945

In this class, students will achieve a deeper understanding of the present by examining forces and events that have shaped the world since 1945, focusing especially on the changing nature of conflicts within societies and between states. We will alternate between broad coverage of major trends (such as decolonization and the collapse of Communism) and closer examination of specific topics (such as the division of the Korean peninsula, the rise of Al Qaeda, and the war in Ukraine). While all areas of the world will receive some attention, Europe and the Middle East will have the most prominence. In most weeks, students will write a response paragraph on an assigned question. The class has no tests or longer writing assignments. Open to 11s and 12s.

Mesoamerica

Hieroglyphs carved in stone or traced in bark-paper books; pyramids aligned with the stars; an intricate calendar of intermeshing cycles; human sacrifice, royal bloodletting, a ballgame symbolizing the struggle between light and dark, life and death. These hallmarks of Maya civilization were in fact practiced throughout Pre-Columbian Mesoamerica, a region stretching from central Mexico to Honduras. They will loom large as we examine the development of Olmec, Maya, and Aztec cities (among others), from the second millennium BCE to the conquest of Mexico in 1521, with a focus on the dazzling city-states of the lowland Maya during the Classic Period (c. 250–925 CE). We will necessarily engage with a variety of evidence, including material remains, works of art, and inscriptions; class time is largely devoted to viewing and analyzing slides of these monuments. We will also rely heavily on the K'iche' epic *Popol Vuh* to reconstruct Maya religion. You will therefore use all the skills you have honed in your history and English classes (plus a little math), and learn about some of the techniques archeologists and anthropologists use to reconstruct the past, such as ceramic analysis and the ethnology of indigenous peoples. While there will be periodic quizzes on factual information, most written work will involve the analysis of specific buildings, artifacts, or texts. Open to 10s, 11s, and 12s.

"History, I've concluded, is at its core the celebration of the Human Condition: the small man will hurry through his brief, uneventful (or all-too-eventful) time in the world in a few decades, but two thousand years later, a six-year-old boy may marvel at a plaster copy of his remains. (Full disclosure: that boy was me—that day I fell in love with history.) Personally, I find it hard to conceive of anything more beautiful than this connection through time."



"This course changed the way I examine society. We analyzed sociology, history, political science, mythology, and philosophy in our discoveries—deep in the smooth and delightful subtleties of Greek literature. Some of the texts we read still haunt me (in a good way!)."

HUMANITIES & SOCIAL SCIENCES

Methods in Urban Planning

This course will begin with a brief overview of city planning before American colonization in order to understand the formation of the modern city, and then we will focus on the United States. We will use cities as source material to evaluate each significant trend in addition to writings by the major urban planners of the times. We will examine demographics, housing numbers, and engineering solutions to current problems. There will be multimedia planning projects, including work designing in 3D with computer software. Open to 11s and 12s.

Economics

Why aren't rent controls efficient? What exactly is bad about monopolies? Is the free market truly the best economic system? What does the Federal Reserve Bank do? In Economics, you examine these questions and many others. In the first semester, we will study the law of supply and demand, market structures such as perfect competition and monopoly, and both the extraordinary efficiencies and the inefficiencies of the free market. In the second semester, we will turn to the economy as a whole. What is GDP? How do we ensure economic growth, low unemployment, and low inflation? Can we actually do this? We will study fiscal policy, such as stimulus spending and tax policy, and monetary policy, those mysterious actions by the Federal Reserve. This course will prepare you for both the Microeconomics and Macroeconomics AP tests. Open to 12s, and 11s with permission.

Art History

Every class begins with an image of a work of art, projected on a screen. Major ideas emerge from the details—not from lectures or general surveys, but rather from what you observe and how you respond, and from lively exchanges with your classmates. Similarly, you will write most of your essays in class, basing them on your own first-hand experience of works of art you've often never seen before. In looking closely at details, such as a painting's colors, composition, and brushwork, you will begin to build a coherent interpretation. Your confidence in your eye and critical judgment will grow. Examining several works by a particular artist, you will make imaginative connections. In this way, you'll be able to work toward a larger understanding of an artist's whole career and their contribution to the development of art in a given period and beyond. What is happening in the artists' imaginations and in the world that accounts for the specific art they made? You will look for answers to this question in the works of art themselves and the artists' own words in their letters and journals. You will also get to know Boston's great art collections and write about some of the works of art in them.

Film Analysis: American Film

Cultural interests, fears, and desires; historical events; worldviews, realities, and mythologies—a country's films arise from these, propagate them, and respond to them. With this in mind, we'll spend the year experiencing American history and the country's "psyche" through the lens of its films, from some of our country's earliest movies up to fairly recent films. The films we'll watch fall into a variety of genres. The plan (subject to some variation depending on what we decide as a group) is to spend the first part of the year watching early and/or seminal examples of distinctively American genres (the Gangster Film, the Western, the Musical, the Screwball Comedy, Film Noir, etc.) and discussing particular themes and preoccupations. Depending on interest and time, we may also view more recent films that may be seen as responses to their forerunners—there are countless examples of homages, critiques, and revisions to enjoy. Time permitting, the

final part of the year may be devoted to independent projects on a film, style, genre, or director of your choosing. As in English class, we will "read" closely, and our discussions will "quote" liberally from our text. Here, though, our texts will be the films. We'll use our growing knowledge and vocabulary to discuss how each film is put together: we will, of course, discuss plot and theme, but we will also think about how the art and craft behind each film affects our response. Open to 11s and 12s, and 10s with permission of the instructor.

Comparative Literature: The Nature of Epic

This course examines traditional epics from Africa, Asia, Europe, and the (pre-Columbian) Americas. After a brief study of the oral-formulaic nature of heroic poetry, we'll read a number of (shorter) epics, both as literary art and ethnographic artifacts cataloging each culture's peculiar norms and values. Some epics we'll read, such as the Central Asian Manas cycle, have been transcribed directly from improvised oral performances; others, such as the West African *Sundiata*, are composite texts; still others, such as the medieval Irish *Táin Bó Cúailnge*, are prose works that recast earlier hero stories. While each tradition is a world unto itself, one question that will run through all our studies is "What is the nature of epic?" We'll also consider how traditional epic differs from literary epic (e.g., Milton's *Paradise Lost*). In the spring, students will explore these questions independently by presenting on a traditional epic not covered in class. Some exposure to Homer over the summer is recommended but by no means necessary. Open to 10s, 11s, and 12s.

Jazz Theory 1

Jazz music can be deeply instinctive or intensely cerebral—sometimes both at once. When listening to the shifting chord changes of Duke Ellington's "Caravan" or the abstract ensemble improvisations of late-era Coltrane, have you ever wondered how it all hangs together? Beginning with Jazz Theory 1, you can find out. We combine close listening to jazz performances with learning basic music theory: notation, ear-training, harmony, and music theory allow you to grasp concepts of improvisation. You will become a literate musician. As you come to understand more fully what you hear, you also gain a historical overview of jazz and how great jazz performers work. This gives you the opportunity to define your own role in a jazz group—which is helpful, since every student in Jazz Theory must take Jazz Ensemble as well. Most work is done in class, including exploring concepts on your instrument.

Jazz Theory 2

As you advance your understanding of jazz theory (you can take this class for up to four years), you will become increasingly knowledgeable and adept at listening, playing, analyzing, and composing. We do intense ear-training and study harmony, nomenclature, and writing jazz notation. More advanced classes include jazz arranging and jazz composition. All the way through, we emphasize playing what you learn and incorporating your skills into performance situations—such as Jazz Ensemble!

Music Theory 1 and 2

We study notation, music history, rhythm, pitch, and intervals. You'll do formal analysis and four-part writing, including secondary dominants and modulation. Heavy emphasis on ear training and solfège teaches you to listen. Music, like any language, is a system; understanding how it's put together helps you comprehend—analytically and therefore more pleasurably—any kind of music and notice correspondences between different styles of music. In the second year, we deepen our structural and formal analysis of music and do more sophisticated ear training and composition exercises. Often students are ready to take the Music Theory AP by the conclusion of this course. All members of both classes must also join either Orchestra or Chorus.

"We learned concepts that explain how decisions are made and prices are set. Money makes the world go 'round, and studying economics helped me understand why and how."

"I came to realize that painting is not just an exercise in color and texture. Ultimately, these works of art reflect on our very own existence, our very lives."

Conducting and Advanced Music Theory/Composition

This course is for students who have completed the school's music-theory sequence and have scored a minimum of 4 on the Music Theory AP exam. We study basic and complex beat patterns and independence of hand gestures as we continue with advanced ear training and score analysis. You will discover ways to use physical gestures to mold individual phrases and to weave them into a unified whole. The goal is for you to learn the skills that will enable you to conduct the chorus or the orchestra during a rehearsal or performance in the spring.

Psychology

What do dreams mean? Can memories be repressed? What are the psychological motives for racism? Can statistics "lie"? How can academic research inform social policy decisions? Is IQ determined by genes or environment? What causes mental illness, and what are the most effective treatments for it? In Psychology, we will examine these questions, among others, from various points of view. We will read classic and contemporary texts by prominent theorists and researchers in the field. We will consider the historical evolution of psychological questions and ideas, and explore professional disagreements and controversies. In the classroom, we will combine lecture, question-and-answer, interactive activities, and open-ended discussion. We will also use media sources (newspaper articles, television and movie clips) and some clinical case material to illustrate concepts and facilitate conversation. The course will also introduce students to basic social science statistics and research design.

"If you're interested in theory, the level of your musical background doesn't matter. The program here can take people at any level and bring their theory to an AP level in just two years."

"After four years of working with words that once sounded clunky, when I read Spanish literature now, I think in the language. The same transformation can occur in every discipline. You can learn to think in the language of science or the language of history. When this happens, you see things fit together in a beautiful harmony, and the field belongs to you."

LANGUAGES

French 1 and 2

Vocabulary, verbs, grammar. Within weeks you'll be holding short conversations and reading short texts. Using a college-level textbook, *Deux Mondes*, we cover French grammar in two years. Nightly oral and written homework, exercises and self-evaluations on the Web, and (because classes are so small) lots of discussion and debate yield satisfying results: you'll rapidly begin to feel at home in French. Soon we delve into stories, poems, films, newspapers, and magazines. In addition, we investigate aspects of French life, from the arts to politics. Sometimes we make crêpes or mousse au chocolat. After two years, you'll speak, write, and understand French: you're ready for an AP-level course. *Bonne continuation!*

French 3

French 3 is a fully immersive experience. Students take what they learned in French 1 and 2 and start honing their four key communication skills in French—reading, listening, writing, and speaking—as they consider various topics pertaining to French and Francophone cultures. We continue using *Encore*, which we began in French 2, but wean ourselves off of it as we read folktales from France and the Francophone world and watch movies inspired by them. In the second semester, we read three plays: *L'Île des esclaves*, *Rhinocéros*, and *"Art."* Students read the plays out loud, perform scenes, and learn about the social and historical contexts in which the plays were written and first performed. While many students feel more confident taking the AP their fourth year, strong students may take the AP in the spring of French 3 with a little independent work.

French 4 Conversation

The Conversation half-credit of French 4 will draw from a wide variety of media and modern to contemporary themes pertaining to French and Francophone cultures. We will study the idiosyncrasies of spoken French through a contemporary play and a handful of movies. We will learn about French YouTube and will listen to podcasts on Spotify, all with an aim to learn about modern (twentieth century) and contemporary (twenty-first century) French society. Students will engage in conversation in class and will practice spoken expression in recordings and in presentations. Students who did not take the French AP after French 3 will be prepared to do so after this class.

French 4 Literature

For this Literature half-credit of French 4, we will survey nineteenth-century France—the century of revolutions—through its literature, its visual arts, its philosophers and politicians. Beginning with the fall of Napoleon at Waterloo (1815) and ending with the outbreak of WWI, this class provides a glimpse into a century rife with social upheaval and artistic innovation that still bear their stamp on the cultural landscape of contemporary France and beyond. Through poetry, prose, and the visual arts, we will understand the stakes of cultural and literary movements such as Classicism, Romanticism, Naturalism, and Symbolism. Our readings will draw from literature of the period by writers such as Victor Hugo, Balzac, George Sand, Claire de Duras, Alfred de Musset, Flaubert, Zola, Baudelaire, Colette, and Proust. This course is recommended for students who have finished French 3 with at least a B+, or who have already taken a half or full credit of French 4 in its previous iteration.

Latin 1 and 2

In two years, Commonwealth's Latin program completes all the grammar you will need to read the classics of Roman poetry and prose, not to mention medieval and Renaissance

literature. Refusing to be outdone by schoolmates who study "living languages," students from Latin 1 and 2 have been known to sing "The Twelve Days of Christmas" in Latin at our Winter Assembly. From the very start, you will be reading simplified snippets of real Roman literature and, later, longer authentic stories, often by authors or about figures you encounter in our Ancient History course. Famous stories include the founding of Rome by Romulus and Remus and the assassination of Julius Caesar. (But do you know who Cincinnatus or the Gracchi were?) We read classic passages by Cicero and Ovid, and snarky poems by Catullus addressed to his lover's husband as well as his literary critics. Along the way you will also pick up other bits of knowledge—about the history of the Latin language, about the English language, and, just for fun in Latin 2, about how Western languages work in comparison with Eastern ones.

"We read a lot; we analyze a lot; we talk a lot; we write a lot. One day in the middle of the year, I suddenly realized that I wasn't even thinking about the fact that I was doing all this in French."

Latin 3

Latin might be a dead language, but in Latin 3 we begin to read real, live Latin texts! Beginning with prose, we'll sample passages of some early historians (Cato the Elder and Quadrigarius), first-century political players (Cicero and Sallust), and the more stylized prose of the early empire (Tacitus and Suetonius). As we study these prose authors, we will also review Latin grammar systematically, with an eye to subtleties glossed over in the first two years of Latin. In the winter, we transition to poetry: first Catullus, the racy Roman poet who chronicled his loves and hates in shockingly sordid (and often untranslatable) terms. We'll revel in all his hilariously puerile antics but always with an eye toward the profound artistic vision underlying his trifling "play." Then we'll investigate how Ovid, two generations later, incorporates into his epic *Metamorphoses* Catullus' poetics of the intricately wrought poem as well as his obsession with the beauty and terror of human desire.

Latin 4

Gallia est omnis divisa in partes tres. ("Gaul is all divided into sections—three, in fact.") Caesar's authoritative opening to his *Gallic War* might be the most famous Latin sentence ever written, but it's curious that the record of his military campaigns should begin with some rather deceptive historical geography, implying that Gaul is not a nation but merely a word that arbitrarily bundles a few unrelated "sections," each more barbarous than the next. Is he subtly justifying Roman imperialism—not to mention his own boundless ambition? Fast forward one generation to Vergil's *Aeneid*, part homage to Augustus, Rome's first emperor, part lamentation on the human cost of empire. Shall we, like Saint Augustine before us, grieve the death of Queen Dido for love of pitiless Aeneas? Or pity Aeneas, the man of grief destined to found the race that will vanquish all nations? Whether the tragedy of star-crossed lovers or Rome's grim history, the same war in heaven is the cause. This is what we'll discover as we relish the heartbreaking beauty of Rome's national epic.

Mandarin 1 and 2

In all Mandarin classes, we work on the four language skills: listening, speaking, reading comprehension, and writing. If you have little or no experience with the language, Mandarin 1 is the course for you. We study Pinyin, the phonetic system of Mandarin Chinese. You will learn to read and write some 120 Chinese characters that form about 150 words. By the end of the first year, you'll find yourself using greetings properly and talking to classmates about yourselves and your families. You'll be able to understand and discuss (simply) topics centered around daily life: school life, weather, and shopping. In Mandarin 2 we further emphasize aural comprehension and oral expression. With support from our textbooks (we start with *Ni Hao*, Vol. 3, and soon move on to the college-level *Integrated Chinese*), you broaden your knowledge of simplified Chinese characters (the system used in mainland China), practicing strokes, stroke order, and radicals. In addi-

tion, we read simple poetry and folktales, listen to music, and learn about festivals and holidays. And throughout your Mandarin studies, you get to make and sample extraordinary food.

Mandarin 3

This intermediate course continues to develop proficiency in all aspects of Mandarin: listening, speaking, reading, and writing. Students' vocabulary will expand to approximately 1,500 words, among which they are able to write 300 characters. Greater sophistication in oral discussion and written expression is expected. Students will be able to engage in literature and conversation about various aspects of life, from seeing a doctor to planning a trip.

Mandarin 4

In this high-intermediate course, students continue to build upon their language skills in listening, speaking, reading, and writing. Students' vocabulary will reach nearly two thousand words. By the end of the course, students will be able to discuss topics of greater sophistication and significance using advanced vocabulary, expressions, and grammar structures. Students will deepen their understanding of those topics through research, discussion, and debate, and they will showcase their understanding via essays and presentations.

Mandarin 5

In this advanced course, students continue to develop their Mandarin skills. This course is offered as a full-credit or a half-credit course depending on student interest. Students should discuss their particular interests with the instructor to determine the focus of the course and the material used.

Mandarin 6

In this advanced course, students continue to develop their Mandarin skills. This course will be offered as a full-credit or half-credit literature course depending on student interest. Students should discuss their particular interests with the instructor to help determine the focus of the course and the material used.

Mandarin Literature 4

In this literature course, students continue to develop their reading and writing skills in Mandarin. Students will read classical prose and poetry as well as modern and contemporary works of literature. Students will write poems, stories, and essays. This course is offered as a full-credit or a half-credit course depending on student interest. Students should discuss their particular interests with the instructor to determine the focus of the course and the material used.

Spanish 1 and 2

We plunge immediately into the study of the four basic language skills: speaking, reading, writing, comprehension—and no English in class! Literary or journalistic texts and videos will give you a glimpse of the vast world of Spanish and Latino culture. In addition, you often write stories and essays or skits that you present to your class. In Spanish 2, the main subject of study is the country of Spain, with a particular focus on the autonomous community of Andalucía. The cultural sourcebook (compiled by a Commonwealth Spanish teacher) lets us work with a rich and increasingly sophisticated selection of literary, historical, political, and illustrated art-historical articles. We look at dance and films; we listen to music. Early in Spanish 2, we also begin preparation for our March exchange trip. You write blogs and correspond with the Spanish student who will be both your guest and your host.

"To understand a text critically, to formulate my own thoughts, and to express them clearly through writing or speaking up in the classroom, that was my goal. Taking risks with my own opinion about a passage in Latin became an exciting daily challenge."

"Our teacher told us once, 'If I could airdrop my students into China, I would want them to be able to survive.' I think if she did that now, we could!"

Spanish 3

In this course, literature and history spur discussion as students reinforce, extend, and enrich their fluency and pronunciation. The course is based on the culture and literature of Peru. Students will read pieces by Mario Vargas Llosa, José María Arguedas, and César Vallejo, among others, and be exposed to different writing styles and cultural backgrounds. Students will also read newspaper articles and essays on the economics and politics of Peru.

Spanish 4 Conversation: Current Events and Cultural Trends

This class will use newspaper articles, podcasts, blogs, newsreels, and short documentaries to initiate conversation about current events and cultural trends in the Spanish-speaking world and beyond. With a special emphasis on reading comprehension, oral expression, and socio-cultural competence, we will use different formats (presentations, dialogues, interviews, group activities, role-play, etc.) to practice multiple modes of communication in Spanish, from the informal to the official, in a variety of settings.

Spanish 4 Literature: Magical Realism (De lo Real Maravilloso y lo Fantástico en la Literature Latinoamericana)

This course introduces students to Latin American authors who explore two genres: magical realism and fantastic literature. Students will read and analyze various stories and short novels, as well as write critical essays. Our principal goal is to strengthen students' command over the Spanish language, in both oral and written use, and also to use literary criticism to deepen students' understanding of a text. Some of the authors we will study in class are Gabriel García Márquez (Colombia), Jorge Luis Borges (Argentina), Bioy Casares (Argentina), Felisberto Hernández (Uruguay), Leopoldo Lugones (Argentina), Mario Benedetti (Uruguay), and Carlos Fuentes (México).

"Our discussion topics have included immigration, the Cuban revolution, dictatorships (Dominican Republic, Chile Argentina, Cuba), sexuality and society, music—to sum it up, just about anything you can fruitfully talk and argue about."

"I have now implemented most major data structures. I know exactly how they work. The CS3 class is literally just students working together to write data structures. It's the definition of engagement and cooperation."

COMPUTER SCIENCE

Computer Programming Essentials (CS 1)

This course provides a first look at the ideas of Computer Science and Programming and is designed for students with no prior experience coding. Using a variety of languages, students will learn the basic tools used by programmers throughout a variety of disciplines, including data visualization, music generation, game design, and mathematical problem-solving. The course will be entirely project-based and inquiry-driven, with time divided equally between in-class discussions/lectures and labs. We will cover foundational topics such as variables, conditionals, loops, and functions, with previews of further topics such as recursion and data types. No experience needed.

Designing Programs (CS 2)

This class provides a thorough and mind-stretching introduction to computer science's most fundamental tool: programming. The course uses the pedagogically driven student languages provided by DrRacket to allow for focus on program design. By learning the essential habits of systematic problem solving, students will be able to create complex programs such as video games, text editors, and document analyzers. Topics include data design and structure, recursion, abstraction, higher-order functions, and event-driven programming. No prior experience is necessary, and the course is open to all grades; however, expect the course to be intensive and time-consuming. This course is most appropriate for students with experience in analytical thinking and developed time-management skills. Access to a computer at home is strongly recommended.

Designing with Classes (CS 3)

Building upon the foundation provided by Designing Programs, this course looks at programming from the perspective of classes. Shifting to Java, an object-oriented language, students will be exposed to industry-standard tools such as loops and streams, as well as grapple with the benefits and stringencies of a statically typed language. Now, instead of solely functions consuming and returning data, methods will have access to "this" object's data, and then use it for the majority of the computation. Topics such as structured, union, and recursive data-types; abstraction; and higher-order programming are reassessed through this outlook. The course also introduces crucial concepts such as state, mutation, and memory and runtime analysis; it will culminate in the building of a full chess game and artificial intelligence. Designing with Classes also prepares students for the AP Computer Science A exam.

Computer Science Theory (CS4)

After several years of intensive programming, students in this course will gain an appreciation for and experience with the mathematical underpinnings of computation. To enable the study, the course begins with a study of discrete mathematics, including an introduction to combinatorics and set theory, as well as various proof techniques. From there, students will analyze increasingly complex models of computation, going all the way from finite state machines to Turing machines. Armed with the Church-Turing thesis, the class will be able to prove what problems are not computable. The runtime analysis that began in Designing with Classes will then be greatly expanded upon in the study of complexity theory, which covers the infamous, unsolved P vs. NP problem. The course ends with a study of algorithms, and techniques such as divide-and-conquer, greedy algorithms, and dynamic programming will be covered. The course offers a healthy mix of pencil-and-paper and programming assignments.

Programming Languages (CS 5)

Having used them extensively for several years, we will now study the design of programming languages. From both a theoretical and practical perspective, students will formally define and then implement programming languages that gradually increase in complexity, both syntactically and semantically. These languages will be built in variants of Typed Racket and will build upon concepts studied in all prior computer-science courses.

"My freshman year Geometry class was inspiring. Suddenly homework became a 'choose your own adventure story'—each student doing work in different ways. I learned how to plan an attack on a problem, and also how to restart and try again when I had gone down the wrong path."

MATHEMATICS

Intermediate Algebra

In Intermediate Algebra you will start by reviewing Algebra 1, with a focus on manipulating variables with confidence and modeling word problems with solvable equations. The course then turns to the start of Algebra 2 with a full study of quadratics, rational expressions, and conic sections. You will not just learn how to do algebra; you will also understand why it works as you develop your mathematical intuition.

Geometry and Geometry Advanced

More than two thousand years ago, Euclid wrote down the foundations of modern geometry in what is probably the most famous math book ever written, *Elements*. What did he get right? What did he get wrong? In Geometry you will study a modern form of Euclid's assumptions and see for yourself what can be proven. This course not only teaches you what is true in geometry but also why it is true. The main course focuses on geometric facts and learning to write clear proofs. If you take Geometry Advanced, you will delve into more philosophical aspects of modern mathematics. What does it even mean in mathematics for something to be "true"? Studying hyperbolic geometry will challenge your preconceptions of how the world works and bring you closer to the beauty and mystery of theoretical mathematics.

Algebra 2/Precalculus and Algebra 2/Precalculus Advanced

Functions do all the heavy lifting in mathematics. In this course, you will learn to manipulate functions and represent them in different ways, from equations and tables of values to graphs. You will also study the basic panoply of common functions, from the steadfast polynomial to the transcendentals: exponential, logarithmic, and trigonometric functions. You will learn about these building blocks and how to transform and combine them into new and wonderful conglomerates. With these analytic tools in hand, you will also study conic sections, systems of equations, and (time permitting) matrices and probability.

Calculus 1 and Calculus 1 Advanced

Algebra is the study of functions; Calculus is the study of how functions change. In Calculus you will learn about derivatives, what mathematicians call instantaneous rates of change: how fast an object is falling at any given time or how fast a radioactive substance is decaying (what is a half-life?). You will also study going in the other direction: if you know exactly what velocity you've been traveling at any given moment, how do you figure out how far you've gone? Calculus 1 focuses on the theory behind calculus and real-world applications. It will prepare you for the Advanced Placement Calculus AB exam. Calculus 1 Advanced covers more advanced applications and shows proofs with more rigor.

Calculus 2

Here's your chance to take what you learned in Calculus, master all the details, and then extend those results to such applications as calculating arc length and the surface area of a solid of rotation and to calculate for parametric and polar functions. You'll learn to anti-differentiate more complicated functions and then study infinite sums. The terms get smaller, yet there get to be more and more of them. How can you tell whether an infinite sum will stay bounded or explode? This course will prepare you for the Advanced Placement Calculus BC exam.

Multivariable Calculus

After a review of single-variable calculus, you'll cover infinite sequences and series. As in Calculus 2, you'll learn to distinguish those that come to a limit from those that "diverge" to infinity. In the second semester, you will encounter multivariable calculus. Instead of derivatives, you'll learn about partial derivatives. From the single-variable integral, you'll turn to vector functions, line integrals, and double—and even triple—integrals. If time permits, you'll learn about the mysteries of Lagrange Multipliers and Green's and Stokes' Theorems. This course also prepares you for the Advanced Placement Calculus BC exam.

Linear Algebra

This course offers a comprehensive treatment of vector spaces and subspaces, basis and dimension, matrix representations of linear transformations, linear functionals and dual spaces, determinants, theory of systems of linear equations over a field, eigenvalues and eigenvectors, diagonalizability, and operators on inner product spaces.

"When I came to Commonwealth, I was not a math person. After four years of intensive math training and application in other classes, though, I have come to have a rich and abiding love for math and all of its applications."

Abstract Algebra

Abstract Algebra is the purest of pure math courses. In this challenging, college-level elective, you will study the most fundamental of mathematical objects: groups, rings, and fields. Are there other "number" systems that mimic certain properties of the real numbers? In what ways are they the same, and in what ways do they differ? In this course, you will discover the solutions to some long-time geometric puzzles: Can one construct a cube of volume two or trisect a given angle using a compass and straightedge? You will hone your abstract mathematical skills and your ability to write clear and effective proofs.

Statistics

This accelerated course addresses visual representations of data, measures of spread and central tendency, observational studies, sampling and experimental design, probability and modeling, the Law of Large Numbers and the Central Limit Theorem, distributions of sample means and sample proportions, and the basics of statistical inference. The course covers a significant portion of Moore and McCabe's Introduction to the Practice of Statistics and prepares students for the AP Statistics exam.

"What a surprise it was—and what fun—when I began to understand that math is about so much more than a bunch of calculations and equations!"

Statistics and Applied Mathematics for Social Choice

Enrollment by recommendation of the department. As members of communities and participants in democracy, we often feel strongly about the equitability (or lack thereof) that we see in systems of decision making. Sometimes, though, our intuition and feeling are not enough, and concrete mathematical metrics are needed to quantify and qualify just how fair or unfair mechanisms may be. This course will explore these ideas in the realms of voting, gerrymandering, apportionment, and allocation: we'll quantify the power of committee members with probability, measure the fairness of districting maps with ideas from geometry, and seek out fair divisions of shared goods with algebra, all with a focus on hands-on applications to real-world systems.

Theoretical Calculus

What happens when knowing how calculus works isn't enough? What do the real numbers have that the rational numbers don't? Theoretical Calculus develops all the theorems of calculus from the axioms of real numbers, including the elusive Completeness Axiom. Enter the world of suprema and infima, follow the partition definition of definite integrals, and revisit old friends such as the Fundamental Theorem of Calculus. When you're done with the basics, you'll use these same methods to investigate infinite sequences and series of numbers and infinite polynomials. You'll end with an introduction to the beautiful theory of

complex power series, including a quick proof of the famous Euler equation, $e^{i\pi}+1=0$. Theoretical Calculus is equivalent to an Introduction to Real Analysis course in college. Some of the easier material will prepare you for the Advanced Placement Calculus BC exam.

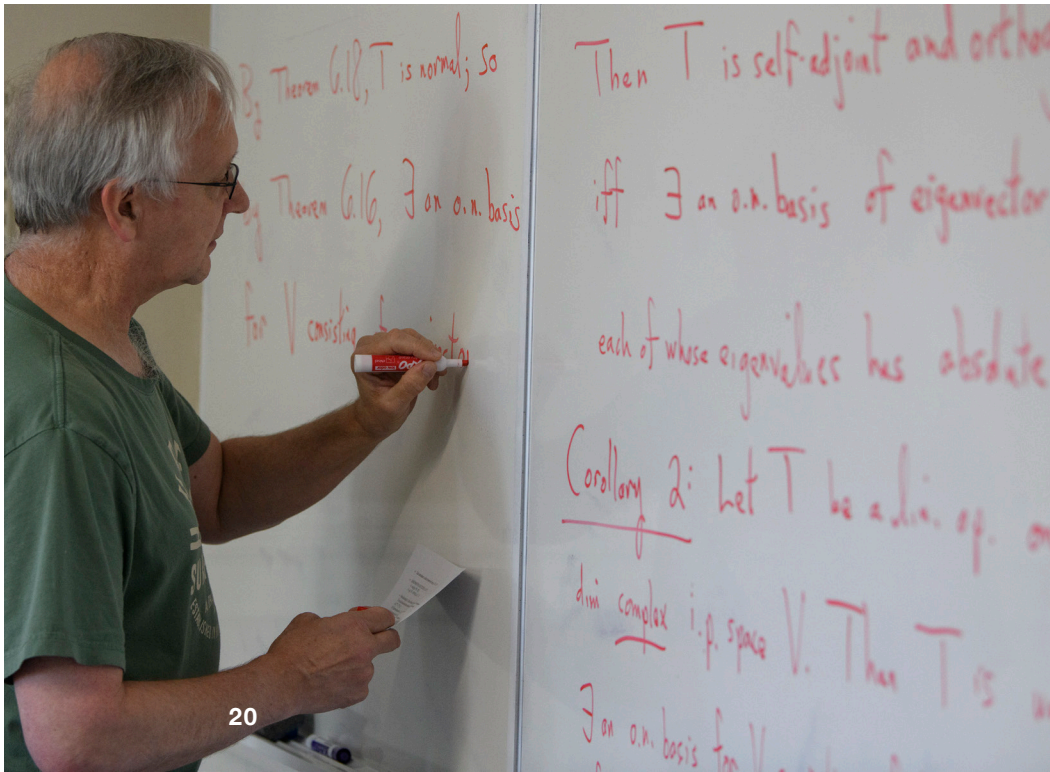
Differential Equations

Enrollment by recommendation of the department. Differential equations are the language of mathematical models for all real-world applications. We will begin with a study of forced vibrations with sinusoidal inputs in elastic systems and simple RLC circuits to understand phenomena like resonance and phase shift. By extending our study of Taylor polynomials, we will be able to then tackle more complex linear differential equations with variable coefficients, applicable to heat flow and radiation. Laplace transformations will allow us to model systems with discontinuous inputs and impulses so we can understand how a system might respond to a hammer strike or a circuit to the sudden flip of a switch. Finally, Fourier series will allow us to model periodic inputs such as square or triangular waves. This full-credit course will cover a standard university curriculum in differential equations for science and engineering majors.

Axiomatic Set Theory

Axiomatic set theory provides a formal system in which all of mathematics can be constructed from a surprisingly simple set of axiomatic assertions, expressible in a beautifully concise formal language, about a collection of pairwise distinguishable objects known as "sets." This course is devoted to a study of ZF, the axiomatic framework due to Zermelo and Fraenkel in which this program is most often undertaken. ZF and just one additional assertion, the axiom of choice, allow us to build a hierarchy of set objects rich enough to capture all of the mathematics that anyone but a small group of logicians would ever need to do. Each model of ZFC contains a set of "natural number" objects that behave as expected; surprisingly, the axioms of set theory allow us to extend these to the classes of ordinal and cardinal numbers—both too large to be sets. Transfinite induction and recursion, generalizations of techniques of the same name on the set of natural numbers, illuminate the workings of ordinal and cardinal arithmetic, transporting us quite literally to infinity and beyond. As time permits, we will begin exploring famous assertions such as the continuum hypothesis that mark the boundaries of what can be definitively known in a model of set theory.

"I'm good at math, and it's always fun, though before Commonwealth I'd always felt that I was essentially learning it on my own, with my textbook and homework. But being in this classroom added more than I could possibly have learned working by myself."



"We learn to look at the patterns, the 'why.' Maybe we'll forget everything we learned in class—all the facts, all the formulas, all the little details—but we'll always have that spirit of inquiry."

SCIENCE

Biology 1

Humans are organisms. We interact with other organisms constantly in ways that may not be obvious at first: brushing our teeth, selecting our food, deciding where and how we choose to live. When we begin to examine our environments closely, we become aware of the diversity in form and function of organisms that populate the natural world. We come to appreciate as well that many of these organisms raise biological questions about ourselves and the ways in which we are remarkably similar to, yet decidedly different from, many other forms of life. Our course materials incorporate a textbook, online reading, animations, and research using both primary scientific literature and summaries of research reports. In addition, weekly laboratory sessions allow us to run experiments and look closely at material we have been discussing. For example, when we examine the properties of stem cells and regeneration, we test the regenerative properties of Planaria through experimentation and observation. Because we are engaging in such a broad discipline, in-class discussions can range from the evolution of cells to the importance of the bacteria living symbiotically in the human gut to the various positions people take on the use and release of genetically modified organisms. And at some point during the year, every breaking story in the biological world becomes part of our conversation.

Biology 2

Our goal in Biology 2 is to use the knowledge you gained in Chemistry to develop a deeper understanding of biological systems. Each unit will be centered around key publications in the scientific literature, both classic and current. We will work together to dissect complex data and gain familiarity with experimental design and modern research techniques. We start the year with two fundamental principles: evolution and the central dogma. We will then delve deeper into the intricate mechanisms that regulate gene expression and the cell cycle during tissue regeneration. Other topics will review macromolecular structure, metabolic pathways, genetics, cell signaling, and ecology. A weekly lab will allow students to pose their own questions and develop experiments to reveal fundamental principles in biology.

Chemistry 1 and Chemistry 1 Advanced

Taking an atoms-first approach, we begin by analyzing the periodic table of the elements. We move from the early concept of atoms as indivisible particles to today's quantum mechanical view. Then, equipped with knowledge about the electronic structure of atoms, we can study the ways in which they bond to form different types of compounds. As we investigate chemical reactions and explore concepts of solubility, acid-base chemistry, and reduction-oxidation reactions, we also develop a quantitative understanding of chemical reactions. If, for example, we burn a hydrocarbon compound in air, how many grams of carbon dioxide and water can we expect to produce? How much heat? What volume will the carbon dioxide occupy? We also work to explain the physical properties of matter. Why is it, for example, that hydrocarbons are not miscible with water and that carbon dioxide is a gas at room temperature while water is a liquid? If you need more background in math, you may opt to take Chemistry 1, which offers a similar curriculum to that of Chemistry 1 Advanced, but our pace is somewhat slower and we take more class time to work on solving problems.

Chemistry 2

Building on knowledge and skills from Chemistry 1 Advanced, we develop a more nuanced and detailed picture of the chemical world around us. Our study of kinetics allows us to connect our macroscopic observations about the rates of reactions to the

underlying chemical mechanisms for the reactions. We begin to see both quantitatively and qualitatively the dynamic chemical equilibria at play in all biological and chemical systems (particularly acid-base and solubility equilibria), how they can be shifted, and how this balance connects to the fundamental thermodynamic relationships between reactants and products. We study how the enthalpic and entropic components of a reaction determine the spontaneity of a reaction. As we explore these fundamental concepts, we simultaneously develop our knowledge of electrochemical reactions, the chemistry of the main-group elements, transition-metal chemistry, and organic chemistry. Laboratory work constitutes an integral component of the course and focuses on quantitative analysis using micro- and macroscale techniques.

"Biology is really a very humbling science. Never again will I be able to see a living thing without thinking about its inner workings."

Astronomy

Astronomy tackles some of the most fundamental questions ever asked: how old is the universe? Is there life elsewhere? What exactly is a black hole? This course aims to provide students with the tools to understand modern research on these and related questions. Beginning with an extensive historical introduction, we will subsequently tour our own solar system, explore planets around other stars, come to understand black holes, examine galaxies, and eventually reach the origin of the universe itself. Emphasis will be placed upon conceptual understanding and empirical techniques. Students will explore their own independent projects, allowing them to dive deeper into topics of particular interest.

Physics 1

Enrollment by recommendation of the science department. How long does it take for sunlight to reach the earth? Why does a mirror flip your image from left to right, but not upside down? If you are accelerating in a car, why do you lean backward, whereas a helium balloon leans forward? In Physics 1, we explore the fundamentals of the physical world. We begin by studying Newton's laws of motion to describe the trajectory of objects under the influence of forces. We then explore momentum, energy, and rotation. In the spring, we move on to other topics, including waves, ray optics, electricity and circuits, and special relativity. Throughout the course, simple table-top demonstrations will help develop intuition.

"The Commonwealth class that's had the greatest impact on my perception of the world might be Chemistry. I now think of vapor pressure when I see towels drying on a clothesline. Admiring stained glass makes me think about absorption spectra. I notice when the temperature of my wood stove is in a state of equilibrium."

Physics 1 Accelerated

Enrollment by recommendation of the science department. This is an algebra-based course that introduces two main branches of physics: classical mechanics and electromagnetism. In the first semester, we will trace the historical development of Newton's laws of motion in order to study the trajectories of objects under the influence of forces. We will encounter the concepts behind energy, momentum, and angular momentum, using them to explain everyday phenomena. In the second semester, we explore the broad utility of these concepts as applied to fluid mechanics, circuits, electric and magnetic fields, and optics. Students will have the option of taking the AP Physics 1 exam.

Physics 1 Advanced

Enrollment by recommendation of the science department. In this calculus-based course, we will formulate the laws of classical mechanics as Newton did in the seventeenth century. Eventually displaced by Einstein's relativity, Newton's laws hold to remarkable precision and serve as an excellent introduction to the study of motion. Topics include the description of motion, forces and dynamics (Newton's laws), momentum, work and energy, rotational dynamics, gravitation and orbits, and vibrational motion. Students are well prepared for the AP Physics C: Mechanics exam.

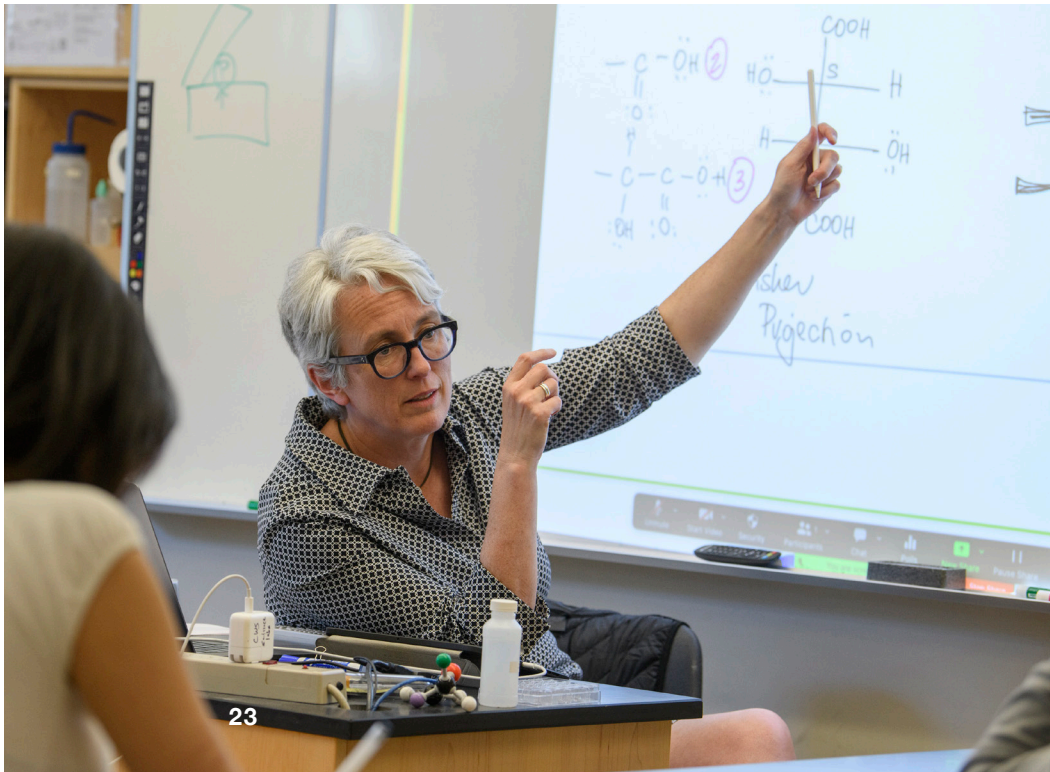
Physics 2

Nineteenth-century investigations into electricity and magnetism culminated in the unified theory of "Electromagnetism," described by Maxwell's four equations. We will study Maxwell's equations in detail using vector calculus, covering topics such as electrostatics, magnetism, electromagnetic induction, electromagnetic waves, and AC and DC circuits. Our reward will be to see that Maxwell's equations are fundamentally incompatible with Newton's Laws. The year culminates with Einstein's special theory of relativity, which, in 1905, "fixed" classical physics, ushering in the era of modern physics. All necessary multivariable calculus will be taught in class.

The Science and Art of Materials

What gives rise to color at an atomic scale? How do the form and finish of an object alter our perception of it? What happens to clay when it goes into the kiln? What is clay? What is happening when we make a photograph? How does the atomic-level structure and reactivity of an adhesive give rise to its properties? Art and science may be related, but there are fundamental differences about how information is gathered and presented. Pablo Picasso once said, "We all know that art is not truth. Art is a lie that makes us realize truth, at least the truth that is given us to understand. The artist must know the manner whereby to convince others of the truthfulness of his lies." In contrast, Richard Feynman asserts, "The principle of science—the definition, almost—is the following: The test of all knowledge is experiment. Experiment is the sole judge of scientific 'truth.'" This interdisciplinary class will explore how closely related the artistic and scientific processes are and the power they have to catalyze one another. Themes such as color, perception, and empiricism will guide our study of materials and methods throughout the year. Each unit will focus on a particular set of materials and techniques, which could include clay, glaze, plaster, polymers, cement, pigments, electroplating, and crystal growing. We will apply the scientific method rigorously to develop, refine, and optimize artistic techniques, and we will create art. This class will push your aesthetic sense and challenge your analytical thinking.

"The measured and analytical approach appeals to me. Given four formulas in physics (my current science and hence my current favorite) and a creative bent, one can derive tens more and solve many types of problems. Facing a problem for which, through experimentation and creative implementations of formulas I've derived, an answer can be reached—no matter the difficulty—excites me."



ARTS

Acting 1

This course is both for students with performing experience and for students who would like to become more comfortable speaking and presenting in front of others. We will learn the basics of actor training and focus on playing together as the foundation of all theater. Classes will include vocal work, theater games, improvisation, and monologue and scene work. Over the course of the year, students will gain an awareness of themselves and how an audience perceives them, asking basic questions such as, "How do I stand and walk?" "Where do I hold tension in my body?" "What are my habits?" "What stories am I telling with my posture?" The year culminates in a group project.

Advanced Acting

In this class we will investigate acting styles as they relate to different dramatic material. How do vocal and acting techniques adjust to this material? Using Shakespeare, Chekhov, classic and contemporary texts—as well as improvisation—students will explore rhythm, timing, and body tension as tools of the actor. Students from Advanced Acting 1, 2, and 3 are mixed in these classes. Some of the cycles of work in any given year may include *commedia dell'arte*, combat, tragedy, clown, original scenes, dream work, and story theater. Actors are strongly encouraged to participate in the school's extracurricular theatrical productions. Within classes and performances, advanced students are allowed to lead warm-ups and actor training.

Chorus

This large choir welcoming all students and teachers. Our eclectic repertoire ranges from Bach to gospel. Although the ability to read music is not necessary to join, you must love music and be open to taking risks and putting in your full effort. You learn vocal technique and musicianship skills: how to breathe, to listen critically, to manipulate different languages, to sing phrases—not just notes—and to work responsibly as part of a larger whole. We have many opportunities for performance: in our fall and spring concerts we perform with the orchestra, student soloists, and the occasional guest professional musician. No prerequisites and no prior singing experience necessary.

Chorale

A smaller, auditioned group. We focus on expressive and precise performances primarily of *a cappella* works from the Renaissance to the present day, including cantatas, motets, madrigals, and jazz. These different styles require an exacting sense of pitch as well as vocal prowess, a keen ear, and advanced musical maturity. The ensemble comes to sing and breathe as one, while you each develop the poise and independence necessary to perform collectively before an audience. Students must also be enrolled in Chorus.

Orchestra

A small chamber orchestra whose overarching goal for players of varying experience and ability is to create a cohesive and musically expressive ensemble. You study classical music from the baroque to the contemporary era. In the fall, we prepare a major piece, such as the Vivaldi Gloria or a Bach cantata, to perform in collaboration with the Chorus. In the spring we undertake a broader range of works. Our orchestra has premiered five student compositions over the last nine years. With teamwork, intensive rehearsing, and dedicated individual preparation, you will grow individually as a musician and be an integral part of a larger experience that is uniquely rewarding for performers and audience alike. The school does not provide private teachers for instrumentalists. Private study outside of school on the student's instrument is highly recommended.

"All of us had already spent time in previous classes studying the smaller musical forms—their minutiae. Now we could move on to consider them in a larger context: how all those tiny details can add up to a glorious whole, like a delicate Mozart symphony or a grand Bach chorale."

Chamber Music

A Haydn string quartet, a Rachmaninoff sonata for cello and piano, a wind quintet—music making doesn't get more intense and intimate than it does in these forms. In a chamber group, you will be responsible not only for your own demanding part but also to the tightly knit ensemble. Matched with other students at your level and based on your interests, you work toward performing a piece that pushes you to grow as a musician. Class members must also take either Chorus or Orchestra.

Jazz Ensemble

Open to all instruments, vocalists, and levels of skill. Learning and practicing leads us to a spirited concert in the spring. We play material drawn from all decades of jazz, including compositions by Duke Ellington, Herbie Hancock, Miles Davis, John Coltrane, Wes Montgomery, and John Scofield, to name a few. We also, of course, choose material based on how many of us there are in any given year and what instruments we play. Jazz ensemble members should be able to read music, although pieces are also taught by ear. Participation in the jazz theory classes is recommended but not required.

Beginning Photography

This course is a hands-on introduction to the art of photography, covering aesthetic principles as well as technical skills. The curriculum spans historical and modern photography, with a focus on analog processes. Students begin by learning the basic operations of a 35mm manual camera, then progress to film development and darkroom practices. These foundational skills support thematic projects assigned throughout the first semester. Lectures will introduce students to a diverse array of artists, enhancing their understanding and inspiring their creative work. Students will also explore alternative photographic processes, such as Cyanotype printing, to broaden their artistic repertoire. The course culminates in an introduction to digital techniques, using Photoshop to edit scans of film negatives, bridging traditional and contemporary photographic practices in preparation for more digital work in Advancing Photography.

Advancing Photography

This project-based course provides the platform for returning students who have completed Beginning Photography to deepen their photographic practice and refine their artistic vision. Starting with advanced digital techniques, students work on enhancing their work through weekly assignments. The curriculum promotes a more thorough investigation of themes and concepts central to photography. Students will also revisit alternative processes with more sophistication, working with advanced techniques such as printing their own digital negatives. The course empowers students returning to photography to pursue their independent projects and receive constructive feedback from peers and faculty in a collaborative studio environment.

Beginning Printmaking

From the outset, this class combines observation and hands-on work. You study both traditional and contemporary printmaking methods, examining a wide selection of master prints created through the centuries. At the same time, you familiarize yourself with the requisite tools as you make monoprints, linoleum cuts (both monochromatic and color), and intaglio prints. You get to try out and discover your favorites among a number of techniques: line etching, aquatint, soft ground, spit biting and open biting, hand coloring, and collograph. While you work and experiment, you concentrate on refining your drawing and composition skills. You'll soon find yourself developing your own visual vocabulary.

"It astonished me to see how many uses people can find for the materials in the studio. One of my friends modeled a circuit in clay to explain a physics problem he was thinking about. Another hand-built an elephant. Other kids in the class made pots, pitchers, teapots, and ramen bowls. Someone made a bathtub!

"In that sunny fourth-floor studio, I learned to draw, I learned to talk, and I learned to think about art."

Advanced Printmaking

After you've learned your way comfortably around the print studio, you're ready to explore in greater depth the techniques that intrigue you the most. We also now begin to see what happens when you combine techniques. We try mixing traditional and modern (or unconventional) approaches and incorporating innovative elements into the prints we create. You also learn to manipulate computer imaging software, scanners, printers, and photo-etching techniques. The unexpected is always welcome in the print room!

Drawing and Painting 1

As an observer and a draftsperson in this class, you learn to articulate your goals as a picture maker. How do you go about achieving them? You develop technical skills, of course, and learn to use a variety of media effectively and expressively. Many of you will start the year with still-life arrangements, using pencil and dry media. Soon you will be choosing your own subjects and deciding on the length of your projects. By late fall or winter, most of you will be working with paint, studying color mixing and color relationships. Through both close looking and discussion of your compositions, you'll become aware of the different ways you, personally, respond to visual stimuli. You work hard; your confidence builds; your artistic vision broadens; you tackle work of increasing complexity. You develop your own style.

Advanced Drawing and Painting

Having established a strong base of skills—both technical and observational—you are ready to take artistic risks and enter untested ground. In drawing, that might mean a life-size self-portrait rendered in pastel on toned paper, a work where color relationship is as important to you as the features of the face. In painting, you might undertake a vision of a magical landscape described in detail in a book you love. Those are just two examples. There are no limits. If an idea is worth exploring, you will get the time, materials, and support you need to see it through.

Life Drawing 1

A strong case can be made that everyone should learn to draw the human figure! For the eager draftsperson, regardless of experience, there is no more compelling subject. You draw from a nude model for a double period each week, choosing from among a wide variety of dry media (pencil, charcoal, chalk, Conté crayon, and more). Throughout the year, as you learn to pay meticulous attention to anatomical relationships, proportion, gesture, and light, you will come to develop your own style. A separate period once a week is devoted to anatomy: you study and sketch different sections of a skeleton. This class has no prerequisite other than a lively interest in drawing, hard-to-satisfy curiosity, and the willingness to work hard.

Advanced Life Drawing

With a year or more of experience behind you, you have free choice in your rendering of the figure. Do you prefer dry media or paint? Black and white or color? Vibrant hues? Somber or muted ones? Charcoal? Fingers? Brush? Palette knife? What about the size of your work? It's up to you. In addition, since by now you know most of our models and their strengths, you can work with them in designing particular poses. You will deepen your study of the human figure as a central design element in art.

Three-Dimensional Design

Students in this class will have the opportunity to work conceptually, technically, and functionally in three dimensions to realize their artistic dreams. Throughout the year, students will have the chance to create using various materials, including wood, plaster, metal, and clay. In the first half of the year, students will take a sculptural approach to designing objects and introduce new and exciting techniques for creating in 3D. In the second half of the year, students will be working primarily on the wheel and on the design of functional objects.

"I am concentrating purely on the physical part of what the difference is between what I see with my eyes and what I see on the paper. I think I should try less to copy but more to 'describe' the image that my eye sees. I want my drawing to be a suggestion of an actual object and to look at it as only tones, values, and colors. Then I'll fill in the rest by drawing it the way I think it should be."