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# Upper School Course Catalog 2021-22

*Preparing Boys for Life.*



# INTRODUCTION

The Haverford School is committed to preparing boys for life. Our college-preparatory educational program comprises academic, athletic, and community aspects that offers students both a broad exposure and grounding in several disciplines and the opportunity to pursue and develop more in-depth interests ... and an emphasis on the development of character and citizenship. \*\*

While most of our courses are heterogeneously grouped, certain advanced courses (marked with an asterisk \*) are homogeneously grouped. Within this framework, students are encouraged to pursue a course of study that challenges them beyond the minimum graduation requirements, while allowing time for participation in extracurricular activities and programs as well.

Choosing the course of study that is ***best for you*** requires thought and care. Students should consult parents, advisors, department chairs and administrators when choosing their courses.

The goal is to develop a course of study that:

- develops one's talents and aptitudes through a varied curriculum
- underscores talents and strengthens areas of relative weakness
- allows time for activities, sports and other extra-curricular activities
- challenges you to discover, develop, and expand areas of the liberal arts that can become sources of pride, joy and fulfillment and
- meets all graduation requirements.

Please note:

A student entering the Upper School is placed in the appropriate level of math and language based on previous courses, testing, and consultation with the department chair.



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# GRADUATION REQUIREMENTS

In the Upper School, a student must complete:

**English:** 4 years

**History:** 3 years

**Modern and Classical Languages:** 2 consecutive years of the same language

**Mathematics:** 3 years in the proper sequence and through *Pre-Calculus*, *Pre-Calculus\**, *Functions*, *Statistics*, and *Trigonometry*.

**Laboratory Science:** 3 years

**Fine Arts:** 2 full credits (see Fine Arts Section for more details)

**Athletics or equivalent:**

2 sports in Form III, IV, V

1 sport in Form VI

**Health and Physical Education:** 1 year in Form IV

Satisfactory Completion of the **Sixth Form Project**

## Graduation Requirements by Grade Level

	FORM III	FORM IV	FORM V	FORM VI
<b>ENGLISH</b>	English I	English II	English III	English IV/*
<b>HISTORY</b>	Ancient World	Modern World	United States	Electives Optional <i>Recommended</i>
<b>LANGUAGES</b>	Chinese, Spanish, and/or Latin	Chinese, Spanish, and/or Latin	Language Optional <i>Recommended</i>	Language Optional <i>Recommended</i>
<b>MATHEMATICS</b>	Based on Placement	Next in sequence	Next in sequence	Next in sequence
<b>SCIENCE</b>	Physics	Chemistry/*	Biology/*	Electives Optional <i>Recommended</i>
<b>FINE ARTS</b>	Visual or Performing	See Fine Arts Requirement	See Fine Arts Requirement	See Fine Arts Requirement
<b>ADDITIONAL</b>	Form III Seminar/Study Hall	Physical Education/Health		Sixth Form Graduation Project

## Course Offerings and Registration Guidelines

**Single section, non-required electives:** These courses are typically offered if a minimum of eight students request the course and if an instructor is available.

**Honors Courses:** Advanced courses designated with an asterisk (\*) must be approved by the student's current teacher and ultimately by the appropriate Department Chair. To qualify for an advanced course, a student must earn a grade of A- or higher in that discipline in the previous year. A course designated with an asterisk (\*) is designed to provide a highly motivated, talented, passionate student with a rigorous academic experience that moves at an accelerated pace. Because we want every student to be successful, we are thorough and thoughtful in placing students in our most demanding (\*) courses.

A student in an (\*) course who does not earn a final grade of B or better will be reconsidered before he is permitted to matriculate to the next (\*) course in the sequence. A student in a standard course who wishes to be considered for enrollment in a (\*) course must earn a final grade of A-. Please note that these guidelines do not guarantee (\*) placement. Additionally, some departments require readiness diagnostics (math placement exercise, writing sample, etc.,) and some departments, particularly those whose courses are cumulative in nature such as math and foreign language, may require a grade of A or above to advance from a standard to a (\*) course. In all cases, the department chair, in consultation with the classroom teacher, is the final arbiter of student placement.

**Mathematics:** The Mathematics Department approves placement of students in standard or advanced (\*) sections. Students with special requests and situations (i.e. advanced work in summer school, enrichment courses, etc.) need to discuss their plans with the Department Chair and current teachers before such courses are taken. Advanced students must complete three years of math in proper sequence, even if they have taken the Pre-Calculus course before their third year of math in the Upper School.

**Add/Drop:** The Add/Drop period occurs during the first two weeks of Semester 1 and during the first week of Semester 2. Courses cannot be dropped after the first marking period unless there are extenuating circumstances and only in consultation with the Head of Upper School, the appropriate Department Chair, and advisor.

**Independent Study:** Independent Study is a privilege generally reserved for Sixth Form students in which a student designs a course in a demonstrated area of interest and with the guidance of a course advisor, pursues it independently. See the Registrar to receive an Independent Study Proposal form. Proposals are due by the end of the first week of the semester. The Independent Study Committee, comprised of the Head of Upper School, the Director of College Counseling, and the appropriate Department Chair, will review each proposal. In some special cases during the Sixth Form year, Independent Study may be substituted for a fifth course or added as a sixth course. HONORS AND YEARLONG COURSES CANNOT BE DROPPED IN ORDER TO TAKE AN INDEPENDENT STUDY. Independent Study is intended for work that is not available in the normal school curriculum.



**Non-Haverford Courses:** Credit is not granted toward the graduation requirements for courses taken at a school other than Haverford, though coursework completed in Modern and Classical Languages and Mathematics in Middle School may allow a student to take more advanced courses in those subjects in Third Form.

**The Fine Arts:** The Fine Arts requirement can be met by two of the following:

Satisfactory completion of a one-year course in the arts, or

Satisfactory completion of two semester courses in the arts, or

Satisfactory participation in a number of “Arts Credit Activities”, or

Being an actor or crew member in two school dramatic productions, or

Satisfactory participation in the school chorus or other performance ensemble for one year, or

Satisfactory participation in three trimesters (sports seasons) in Stage Crew.

Stage crew may NOT count for both an Arts credit and a Sports credit in the same season. Students may combine activities to accrue a total of at least a year’s participation to complete their Arts requirement.

**Health and Physical Education:** Health and Physical Education classes are required during Fourth Form. Each student will be scheduled for three periods per cycle for the entire Fourth Form year. All students are required to take Physical Education classes, even if they are playing or managing an interscholastic sport.

**Interscholastic Sports and Non-sport activities:** During Third, Fourth, and Fifth Form students are required to participate in two sports each year and Sixth Form students are required to participate in one sport. Students have the option to play a sport each season of the school year if they desire. The Athletics Department maintains records of each student’s participation in interscholastic sports during his Upper School years.

Students and families, especially those new to the Upper School, will work with the faculty, advisors, and the Head of Upper School in the course selection process. Please call the Head of Upper School if you have any questions.



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	FORM III		FORM IV		FORM V		FORM VI	
	FALL	SPRING	FALL	SPRING	FALL	SPRING	FALL	SPRING
Modern & Classical Languages	Chinese I		Chinese II		Chinese III*		Chinese IV*	
	Latin I		Latin II		Latin III		Latin IV	
	Latin II		Latin III		Latin IV		Latin IV*	
	Latin II*		Latin II*		Latin III*		Latin V* Prose	Latin V* Poetry
			Latin III*		Latin IV*			
	Spanish I		Spanish II		Spanish III		Spanish IV	
	Spanish II		Spanish III		Spanish IV		Spanish IV*	
	Spanish II*		Spanish II*		Spanish III*		Spanish V Cine...	Spanish V Conv...
			Spanish III*		Spanish IV*		Spanish V* Latin...	Spanish V* Liter...
Science					Biology		Advanced Physics*	
					Biology*		Environmental Science*	
	Physics: A Conceptual Journey		Chemistry				Adv. Topics in Chemistry	Astronomy
	Physics: A Problem Based Journey		Chemistry*		Advanced Physics*		Electronics*	Molecular Biotechnology*
					Electronics*	Astronomy	Intro to Engineering	Intro to Engineering
					Adv. Topics in Chemistry	Intro to Engineering	Issues in Environmental Ethics & Policy	Physiology
					Intro to Engineering		Physiology*	
					Policy & Ethics of Environmental Challenges			

# ENGLISH

## *Philosophy and Overview*

The English Department is dedicated to educating boys to see the world around them clearly, critically, and sensitively. Through the study of literature, we strive to nurture young men to be thoughtful and generous forces in their communities and to be able to read, write, and speak with precision and power. As students examine literature, they encounter attitudes and lives that expose them to new perspectives. As they write personal narratives, creative pieces, and analytic papers, they build and explore their rhetorical and artistic skills. As they speak in small discussion groups and in formal presentations, they discover their own voices and learn to listen to each other.

The English program sharpens each student's critical awareness—in reading skills, in writing, and in oration. As students learn to recognize linguistic structures and possibilities, they also come to understand the basic elements intrinsic to literature of many genres. We know that close observation of textual detail enriches the rhetorical quality of thinking, writing, and speaking. We know that writing is a concentrated form of thinking, so we place special emphasis on the writing process. In our efforts to shape and sharpen our students' verbal skills, to expand their knowledge of literature, and to add to their general intellectual growth, we provide memorable and useful experiences. Such is our ambition: that our efforts and associations will instill habits and skills of lifelong value.

### **English I**

This course seeks to ground students in the essential elements of effective reading, writing, and speaking. Two major objectives are to teach students to read for meaning and to express themselves clearly and logically through the written word. Writing assignments vary from analytical and personal essays to journal entries and creative exercises. Most assignments emphasize revision and require multiple drafts. Students read and discuss works from many genres and examine how plot, character, theme, and language inform each other. Lorraine Hansberry's *A Raisin in the Sun*, George Takei's *They Called Us Enemy*, William Golding's *Lord of the Flies*, Rainbow Rowell's *Eleanor and Park*, and short story and poetry selections enhance our students' understanding of the power of language and the richness of human experience. English I also includes a formal study of grammar and usage, based on traditional text and online resources, and vocabulary, largely from *Wordly Wise 3000*.

### **English II: World Literature**

This course exposes students to many genres of world literature and introduces them to the critical idiom. It places special emphasis on close reading and urges students to explore how figurative language, allusion, connotation, and imagery enhance meaning. Students hone these skills through the short stories of Jhumpa Lahiri and Ha Jin, the poems of W.D. Ehrhart, and the drama of Athol Fugard's *Master*

*Harold” ... and the boys* and William Shakespeare’s *Macbeth*. Marjane Satrapi’s graphic novel *Persepolis* and Chinua Achebe’s novel *Things Fall Apart* complete a selection that we hope will challenge and broaden the perspectives of our young men. Expository essays help students develop analytical and critical skills; personal narrative assignments encourage Fourth Form writers to develop their own voice or rhetorical style. Original poetry, short stories, and frequent print or digital journal entries complement more traditional writing assessments. In order to further their ability to communicate effectively and gracefully, students also continue the study of grammar and vocabulary begun in Third Form, turning their attention to usage and the mechanics of writing. In addition to our online subscription to the grammar and usage resource IXL, students continue to use *Wordly Wise 3000* for vocabulary study.

### **English III: American Literature**

Building upon the grammatical foundation and introduction to literary genres established in Fourth Form, this course offers a selective thematic survey of varieties of the American experience. The course includes selections of poetry, fiction, and essays from authors such as Phillis Wheatley, Frederick Douglass, Walt Whitman, Emily Dickinson, Langston Hughes, Nella Larsen, and Ken Kesey. Recent core texts include Junot Díaz’s *The Brief Wondrous Life of Oscar Wao*, F. Scott Fitzgerald’s *The Great Gatsby*, and August Wilson’s *Fences*. Our study of American literary culture serves as the basis for regularly assigned critical papers and personal narratives. Teachers assign a variety of topics, and as the year progresses, students are given greater freedom to choose their topics and their approaches. The department expects papers to be thorough, well organized, clearly worded, insightful, well documented, and substantially free of spelling, grammatical, and mechanical errors.

### **English IV: The Individual and Society (fall)**

The fall term is devoted to honing skills in close reading and careful writing. Students write daily reflections and commentaries, and, in frequent personal narratives and analytic essays, demonstrate their command of rhetorical devices, their emerging mastery of different writing styles, and their growing skill at editing. Resources like William Zinsser’s *On Writing Well* provide accessible and engaging guides for aspiring writers to refine their diction, syntax, and style. Classic and contemporary poetry, creative nonfiction essays, Aldous Huxley’s *Brave New World*, Ta-Nehisi Coates’ *Between the World and Me*, and William Shakespeare’s *Hamlet* allow students to think deeply about how individuals express their relationships with surrounding social structures.

### **English IV\* (fall)**

*Prerequisite: A- average in English III, the recommendation of their English III teacher, and, after consideration of a writing sample, the consent of the department.*

This seminar aims to challenge our most motivated students to become better writers. Students read masters of the essay, study their techniques, and imitate their style. They learn to write—clearly, accurately, and above all creatively—about the world around them. Students write across the literary spectrum to showcase their growing mastery of style: analytic essay, sales pitch, personal narrative,

reflections on authorial style, comparative essay, monologue in unrhymed iambic pentameter. In the second half of the semester, we use our improved critical reading and writing skills to dive deeply into *Hamlet*.

## **English IV: Spring Seminars**

In the spring, English IV becomes a seminar style topic-centered class based on the college model, in which students assume more responsibility for class discussion and presentation. The department gives students the opportunity to indicate preference of seminars, but sections are formed in the fall at the discretion of the department and depend upon staffing and class-size limits. Current offerings include:

### **The Art of the Short Story**

Students immerse themselves in a variety of short stories, concentrating on what makes the short fiction genre special. They also craft original pieces of fiction and discuss them in the workshop format. From work by Alice Walker and Truman Capote, to Vladimir Nabokov and Jamel Brinkley, we read a broad selection of fiction offering a range of narrative voices, including contemporary stories.

### **The Cinema of Masculinity**

Students examine the transformation of American masculinity through motion pictures. Movies often serve as a visual time capsule to help us sort through what men value and abhor in themselves and others from different eras. This course is dedicated to understanding films about men and their relationship to the world.

### **Fiction Writing**

Students craft original pieces of fiction and discuss them in the workshop format. Additionally, we read and discuss published fiction from successful authors like Junot Díaz and Stephen King in an effort to emulate and understand what makes good writing so good. A significant portion of this class will focus on the rewriting and journaling process, so students should be prepared to be reflective and thoughtful.

### **Journalism: Speaking Truth to Power**

Students further hone their writing abilities through a study of a variety of contemporary journalistic lenses: investigative, feature, arts criticism, opinion, sports, and world-affairs news analysis. We read, write, critique, revise, and publish. We also track the state of contemporary American journalism in its print, digital, and social media contexts.

### **Page & Stage**

After close readings of contemporary and classic plays, students view video performances and, safety permitting, attend live performances on Philadelphia stages. We then evaluate the effectiveness of the

productions using the critical language of the arts journalist. Whenever possible, we discuss the creative process with writers, directors, designers, and actors.

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**Seeing is Believing?: The Art of Persuasion in Visual Media**

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By understanding the power of story in visual media, students focus on being a critical viewer. An initial study of advertising uncovers how audience determines all aspects of the final product: narrative, cast, setting, sound, lighting, framing, acting, and more. In the following larger unit on fiction film, the focus centers on how the story is delivered, noting that film has its own technical vocabulary counterpointing those terms used to analyze in literature.



# FINE & PERFORMING ARTS

## GRADUATION REQUIREMENTS

For students who matriculated to the Upper School before the fall of 2019: 1 full credit

For students matriculated beginning in the fall of 2019: 2 full credits

The Fine Arts requirement in the Upper School can be met through the following:

- satisfactory completion of a year-long Visual Art, Music or Theater course equals one full credit.
- satisfactory completion of a semester length Visual Art course equals a half credit.
- satisfactory participation in Choir, String Orchestra, Chamber Music or Jazz Ensemble for one year equals one full credit.
- satisfactory participation in three trimesters (sports seasons) in Stage Crew or being an actor in two school dramatic productions equals one full Theater Department Fine Arts Credit.

Fine Arts activities that are being used as a sports credit (stage crew or performance ensembles) may **NOT** simultaneously count for a Fine Arts Credit. Students must announce their intention that their participation will be for credit at the beginning of each activity. Students may combine courses and activities to accrue a total of two-year's credit to complete their Fine Arts graduation requirement.

# VISUAL ART

## *Philosophy and Overview*

The Haverford Art Department believes that an understanding of and practice in the visual arts is an essential part of a strong liberal arts curriculum. As well as providing learning experiences that lead to further study and careers in creative professions, the art curriculum emphasizes the ways in which working in the art studio teaches broader essential life skills. Artists often work from observation in order to strengthen their ability to see more powerfully and critically. We understand that artists use this powerful visual language of signs, symbols, colors, and forms to investigate and communicate ideas. Through their studies, students become aware of how this language is at work in the world around them and become skilled in their ability to communicate effectively. Works of art often involve subtle meanings and complex systems of expression that go beyond ordinary speaking and writing. The actual practice of making art engages the imagination, fosters flexible ways of thinking, develops disciplined effort, promotes innovation and builds self-confidence. Creative people of all sorts, artists, writers, designers, scientists and engineers are all well versed in the complex and challenging process of bringing new ideas into being.

Through the Visual Arts curriculum at Haverford, students are able to gain a facility with this creative practice, making it transferable across disciplines. For some students the study of art will lead to careers in the arts. For many others, it will develop a valuable facility with the often frustrating creative process of bringing something new into being, whether they do so in the art world, the business world, scientific careers or wherever they find themselves. Others, too will have permanently enhanced the quality of their lives with a fluency in the visual language and an informed appreciation of the arts.

Each course offered provides students with a broad survey of contemporary and traditional art concepts, techniques and working methods. 2-Dimensional courses emphasize the study of art concepts through the use of drawing, painting and printmaking media. 3-Dimensional courses emphasize traditional sculptural media such as ceramics and woodworking as well as the most contemporary techniques such as 3D printing, laser engraving and product design. 2D Design, Photography and Video & Animation students work with some of the most contemporary digital media available to artists creating photographs, videos, animations and graphic design works. Woodworking Arts addresses these same overarching skills through traditional and contemporary work in this medium. Sequential courses build on the knowledge and skills developed in earlier courses but are flexible enough to allow students to move between 2-dimensional, 3-dimensional or Digital media courses. We strive to instill the courage to face challenges, the skills and practices involved in solving complex problems, a fluency in the primal visual language and an understanding and appreciation of the visual arts and the work of artists throughout time and across cultures.

## Visual Art: Foundations

This yearlong course introduces students to the fundamental vocabulary of the visual artist across a wide variety of media, and working methods. Students are exposed to those skills, knowledge and practices fundamental to the visual arts, providing the starting point for all further visual arts courses at Haverford. Students have the opportunity to work with art instructors in each of the four art studios. Drawing, Painting, Sculpture, Ceramics, 3D & 2D Design, CAD, 3D printing, and Graphic Design are explored through a variety of hands-on projects. Each project develops students' visual acuity, their fluency in the visual language and their practice in the creative process. Much emphasis is placed on drawing, painting, sculpting from observation, using the figure, and objects and environments of the students' real world and experiences. By means of structured projects, each student is encouraged to seek imaginative, personal solutions to a wide variety of problems while learning traditional visual art skills and techniques. Creative concepts, strong design and effective use of media are stressed in an effort to help the student challenge himself and tap his deepest creative potential. Historical and contemporary artists and movements are introduced in relation to each new unit of study. Group critiques, online blogs and written "reflections" give each student the opportunity to learn to articulate his observations about his own work and that of his classmates. This process also prepares the students for the written sections of their major final exam project.

*Open to Third through Sixth Form students. This course is the prerequisite for all other visual art courses as it provides the most basic skills and concepts for future work in the visual arts.*

## Two-Dimensional Art I (fall and/or spring)

*Prerequisites: successful completion of Visual Art Foundations. Open to Fourth through Sixth Form Students.*

These semester-long courses serve as the second level in the two-dimensional (drawing and painting) art sequence, building on the skills and concepts introduced in the Foundations course. Working in a variety of media with pencil, charcoal, pastel, printmaking techniques, watercolors, and oil paints, students will explore fundamentals of line, shape, form, value, color, texture, and composition. Students will begin the course working in black and white and later explore basic color theory. Through projects rooted in prevalent themes in contemporary art, students will strive to develop personal concepts that are well thought out and connected to the work of professional artists. Each project offers significant freedom for students to explore their own ideas and develop their creative thinking skills. Students will spend time looking at art throughout history, critiquing each other's work, and writing virtual reflections on their process and product. Students can take both the fall and spring semester course without repeating projects or can combine one semester of this course with another arts semester course.

**Two-Dimensional Art II\* (fall and/or spring)**

*Prerequisites: Visual Arts Foundations and two additional semesters of arts courses preferred. Open to Fifth and Sixth Form students*

This semester long course is the third level of the two dimensional (drawing and painting based) visual arts sequence. Projects continue to build both technical skills and conceptual veristility. Projects offer the opportunity for more personal approaches to solutions to individualized project challenges. Each project will have a reference in contemporary or historical methods and concepts, giving students an understanding of how their work is part of our cultural tradition. As with honors courses in other disciplines, significant time outside of class spent in the studio and or working at home is required. Students can take both the fall and spring semester course without repeating projects or can combine one semester of this course with another arts semester course.

**Two-Dimensional Art Portfolio\*:**

*Prerequisite: successful completion of four semester long courses and departmental approval. An A- or better in previous art courses is necessary for consideration. Open to Sixth Form Students*

Two-Dimensional Art Portfolio\* is an intensive culminating thesis seminar for the most experienced visual art students. The course is designed to transform experienced art students into emerging young artists by stressing the development of a personal visual arts thesis and a supporting body of work. During class and two hours of extra studio time per week, students will create a related body of work in the form of an investigation. Through individual research and experimentation, each student will discover and refine his most eloquent voice for effective communication in the visual language. While individual artists will work in different media and dissimilar concepts, the class will meet as a group to learn about contemporary artists and critique each other's work. The year finishes with an exhibition of students' thesis works.

**Ceramic Arts I (fall and/or spring)**

*Prerequisite: Successful completion of Visual Arts Foundations. Open to Fourth through Sixth Form Students*

Ceramic Arts is one of three second-level courses in the progression of our 3-Dimensional art curriculum. This semester course is designed to provide a thorough immersion into contemporary and historical practices within the field of Ceramics. Ceramic Arts students will be encouraged to pursue a curiosity about the linkages between process, meaning, and perception within a challenging yet supportive studio environment.

Expanding on the ideas presented during the Foundation year experience, Ceramic Arts students will be introduced to and use a huge variety of tools and processes including but not limited to the potter's wheel, figurative sculpture, mold-making, slab-building, and alternative surface treatments. The ultimate aim of this class is to gain the tools and skills to become fearless in the pursuit of an individual artistic voice with skill-building, research, and experimentation happening simultaneously. The work in Ceramics, as in all

visual art classes, aims to strengthen students' ability to think and see critically, to develop a fluency in the visual language, and to become more adept at the creative process. Students can take both the fall and spring semester courses without repeating projects or can combine one semester with another semester art course.

### **Ceramic Arts II\* (fall and/or spring)**

*Prerequisites: Visual Arts Foundations and two additional semesters of arts courses preferred.*

Students in this semester long course to build on the technical skills and processes from Ceramics I. Students will learn to mix glazes and the basics of firing kilns as well as advanced wheel throwing and handbuilding techniques. Complex functional forms such as Lidded Jars, Teapots and Nesting Bowls will be explored alongside figurative sculpture and modeling. Projects in Ceramics II\* are designed to encourage the development of individual student voices reflecting their individual interests and pursuits. As with honors courses in other disciplines, significant time outside of class spent in the studio and or working at home is required. Students can take both the fall and spring semester course without repeating projects or can combine one semester of this course with another arts semester course. **Ceramics Arts II\* is a third level course open to students in the Fifth through Sixth Forms.**

### **Woodworking Arts I (fall and/or spring)**

*Prerequisites: Successful completion of Visual Arts Foundations*

This course allows interested students the opportunity to explore the sculptural and functional aspects of design with wood. At the core of our work is developing an understanding for and a facility with the design process. This project-based course will build from simple construction methods with wood and wood tools and gradually expand the scope and skills used to create more complex forms, culminating in a project of the student's own design. Students will have the opportunity and expectation to work imaginatively while accomplishing the goals of each project. The use of hand and power tools as well as the qualities of selected woods will be a component of each unit. Students will learn the basics of linear perspective, orthographic perspective, and scale drawing techniques used by designers, architects and engineers. Students will maintain sketchbooks for planning purposes and a shared personal blog where they will document the progress of their work and learning. Although similar, each semester will vary enough for a student to take both semesters without repeating any material and to deal with increasingly complex ideas and techniques. Three instructors will team teach this course. Mr. Thorburn (Assistant Head), Mr. Ressler (Art Department) and Will Bryant (Theater) who all have unique experience with fine woodworking and building. Students can take both the fall and spring semester course without repeating projects or can combine one semester with another semester art course. **Woodworking Arts I is a second level course open to students in the Fourth through Sixth Forms.**

### **Woodworking Arts II\* (fall and/or spring)**

*Prerequisite: Visual Arts Foundations and two additional semesters of arts courses preferred.*

Woodworking II\* continues the practice begun in Foundations and Woodworking I that develops both the technical skills and conceptual foundations craftsmen use to design and build functional and sculptural works with wood. New tools and techniques are introduced and basic skills are reviewed and strengthened through increasingly complex project challenges. At this level, instructors guide students' development in the creative practice through a sequence of projects based on individual student interests and experience. Students will continue to maintain sketchbooks for planning purposes that will document the progress of their work and learning. Starting with simple to use scroll saws, and working towards milling their own wood from rough sawn lumber, students will learn new tools and techniques as they continue through the levels. Three instructors will team teach this course who all have unique experience with fine woodworking and building. As with honors courses in other disciplines, significant time outside of class spent in the studio and or working at home, when possible, is required. Although similar, each semester will vary enough for a student to take both semesters without repeating any material and to deal with increasingly complex ideas and techniques or students can combine one semester of this course with another arts semester course. **Woodworking Arts II\* is a third level course open to students in the Fifth through Sixth Forms.**

### **3D Art & Design I (fall and/or spring)**

*Prerequisite: Successful completion of Visual Arts Foundations*

These semester-long courses serve as one of four possible second-level courses in the Visual Arts sequence and builds on the basic skills acquired in Visual Arts Foundations. 3D Art & Design I features a more in-depth focus on the design process in the production of both sculptural and functional objects. Each project will require in-depth research, sketching, idea development, execution, and real-world problem-solving skills. A variety of three-dimensional design projects ranging from simple woodworking projects, fine art sculpture, product, and architectural design will provide students with the multifaceted experience of planning, design, and construction of objects. Students will utilize an array of tools from a personal sketchbook to the industry-standard laser cutter. Students will begin to use software such as Adobe Illustrator to aid in the design of their projects. Although similar, the first semester focuses on seeing and creating objects using the basic modeling methods with wood, plaster, clay, foam, and wire while the second semester expands into exploring the laser cutter's ability to create complex prototypes at industry standards. Students can take both the fall and spring semester courses without repeating projects or can combine one semester with another semester-long art course. **3D Art & Design is a second level course open to students in the Fourth through Sixth Forms.**

### **3D Art & Design II\* (fall and/or spring)**

*Prerequisite: Visual Arts Foundations and two additional semesters of arts courses preferred.*

3D Art & Design II is a third level design and sculpture course that builds on the skills and concepts of three-dimensional sculpture and design begun in Foundations and 3D Art & Design I. Students will focus on technical skills and conceptual development needed to create three-dimensional functional and sculpture works. We will continue to manipulate various 3D materials and media including wood, clay, wire, plaster, cardboard, and found objects. Extensive technical demonstrations will help students develop material interests and studio skills, including innovative uses of both manual and digital processes. Students will develop imaginative and creative solutions through a series of structured problem-solving challenges as well as project proposals for independent projects. As an honors course, students will be expected to drive their own practice and find personal solutions to each project challenge. As part of the creative practice, students will research, write, sketch, prototype, and share ideas in meetings with peers and faculty. Projects will all culminate in a group critique followed by a written reflection, and some work will become part of exhibitions in and outside of school and entered into competitions. Students will be led on studio tours around the Philadelphia area highlighting contemporary art, product design, and architectural implementation. As with honors courses in other disciplines, significant time outside of class spent in the studio and or working at home, where possible, is required. Students can take both the fall and spring semester courses without repeating projects or can combine one semester of this course with another arts semester course. **3D Art & Design II\* is a third level course open to students in the Fifth through Sixth Forms.**

### **3D Art Portfolio\*:**

*Prerequisite: successful completion of four semester long courses. 3D Art Portfolio\* is intended for the most dedicated and experienced Sixth Form students only. An A- or better in 3D Art & Design II\* or Woodworking II\* is necessary for consideration.*

3D Art Portfolio\* is our most advanced sculpture and three-dimensional design course, deepening the skills and processes generated in the Three-Dimensional Art & Design II\* course (see above description). Students will develop a sophisticated body of work with individualized areas of research, and a directed, productive approach to studio practice. Students will have monthly meetings with faculty and guest artists. They will also have off-campus opportunities including field trips to exhibitions, museums, and artist studios that will highlight professional practices in contemporary art in the vibrant Philadelphia area. Finally, the course will introduce students to the possibility of participation in major national competitions and exhibitions, self-promotion, and various creative opportunities. As with honors courses in other disciplines, significant time outside of class spent in the studio and/or working at home is required.

**Digital Arts & Technology I (*fall and/or spring*)**

*Prerequisite: Visual Arts Foundations*

In this semester-long course, students will explore different artistic methods and software. Students will solve complex visual design problems and find their artistic voice. Students will learn about DSLR photography and photo editing, website design, graphic design, laser cutting, CAD & 3D printing, typography, video, and animation. An understanding of composition, color theory, and universal design will be cultivated as students engage in some projects that are centered around personal expression and others with a focus on design for commercial purposes. Students may sign up for fall and/or spring, as the two semesters will have different areas of focus. In the fall semester course, students will primarily explore photography, Adobe Photoshop, and video editing. The spring semester will focus more heavily on Adobe Illustrator, graphic design, typography, and laser cutting. Students in both semesters will hone their creativity, digital literacy skills, and confidence in using emerging technologies. Digital Arts & Technology can be taken a full year or combined with any other semester-long art course.

**Digital Arts & Technology II\* (*fall and/or spring*)**

*Prerequisite: Successful completion of Video/Animation and Photography or Visual Communication in a Digital World*

Students in this semester-long honors digital art course will work across a range of digital media developing personal responses to project challenges related to prevalent themes in contemporary art. Students will deepen their skills with technology-based art mediums such as photography, graphic design, video, animation, CAD, 3D printing, and laser cutting as they explore ideas that are personally compelling and related to the contemporary world of art and design. Students will build on previous coursework as they develop their ability to use the visual language to communicate, persuade, inform, and connect. This honors course is designed for students who have developed the capacity to work in the art studio independently and are able to devote significant time to their projects outside of class. Students may take the course fall semester, spring semester, or full-year without repeating projects.



# MUSIC

## *Philosophy and Overview*

Participation in musical study and performance facilitates an appreciation for beauty, a means of self-expression, intellectual growth and a forum for positive community activity. We believe that one appreciates most what he understands and that one understands best what he has experienced. The music curriculum is experiential and has as its core musical literacy and artistry. Literacy is not an end unto itself; rather it is an avenue to artistry, understanding and appreciation. The curriculum is structured to prepare our boys for a lifetime of participation in the musical arts as performers or appreciative, well-educated audience members. Students have the option to pursue an intellectual study of music through the study of theory, guitar, recording and production, songwriting and history. Students may also pursue performance-based participation in the school's musical ensembles. Performance based study includes options in both vocal and instrumental realms. Students may audition for any number of ensembles, including Men's Choirs, String Orchestra, Chamber Music or Jazz Ensemble. Musical ensembles may be taken in fulfillment of the Upper School Arts Requirement. In addition, because of the physical and cooperative nature of ensemble work, yearlong participation in one of the school's musical ensembles may be used to fulfill one season of sports requirement. Two ensembles, Glee Club and Orchestra, are offered for academic credit.

### **Fundamentals of Music: Theory and Guitar**

This is a yearlong introductory level course to understanding, reading, writing, and creating music. It is intended for students who want to pursue their passion for music but need help building a strong foundation of musical skills, concepts, and language. This course will function as a prerequisite for other higher-level music classes unless a firm grasp of the concepts and skills is demonstrated to the teacher. Students will be expected to begin their mastery of basic to intermediate rhythms in various time signatures, including rhythmic markings; note identification in multiple clefs in every key signature including ledger lines. Intervals, scales, triads, and seventh chords will be introduced both visually and aurally as well as popular song structures/forms, allowing for both analysis and composition of songs. In order to reinforce these concepts, students will be singing, playing the guitar, using MIDI keyboards, percussion, and using digital compositional tools such as Garage Band and Logic Pro.

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**Music Theory and History\***

*Prerequisite: Music Theory and Guitar or instructor approval.*

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This is a yearlong honors level course intended for the most musically proficient and inquisitive students. This is a two-pronged course in which we will cover collegiate level theoretical topics that are applicable to all styles of music. These skills will be reinforced through an intense study of music history. We will start in the medieval era and watch and listen to how music evolves throughout time up to the current hits that are listened to today. As we listen to Gregorian chant we will find a better understanding of melody. The polyphony of the Renaissance will inform our understanding of chord progressions, while the Baroque era will be better understood through counterpoint exercises. While our understanding and appreciation of music deepens through our study of classical music, it culminates in applying all of these concepts to modern music. We will analyze what it is that makes music affect us the way it does and learn how to manipulate sound the same way great musicians have throughout history.

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**Advanced Guitar and Bass Guitar**

*Prerequisite: Music Theory and Guitar or instructor approval.*

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This is a yearlong course for all of the aspiring guitarists/electric bassists. It will teach the necessary techniques to allow students to learn and play intermediate to advanced repertoire in groups and as individuals. Some of the skills that will be covered are scales and modes in multiple octaves and fingering positions; chords in multiple positions across the fret board; fingerpicking exercises designed to increase speed, control, dexterity, and musicality and applying learned skills to repertoire from a diverse array of musical genres.

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**Music Production and Recording (*spring*)**

*Prerequisite: Fundamentals of Music: Theory and Guitar or instructor approval.*

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This course is for students interested in creating and recording music. This course will focus on digital music production and the art of recording music. Students will learn how to use a soundboard to mix music, how to use MIDI instruments and digital instruments to enhance their compositions, how to use music software to create their own compositions, how to set up microphones to record voices and/or instruments, and how to produce a finished product such as a digital album. Students will learn the basics of how to use the relevant technology and then put their compositional skills to the test.

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**Music Composition: Traditional and Digital Songwriting (*fall*)**

*Prerequisite: Music Theory and Guitar or instructor approval.*

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This course is designed to help students compose their own music. A brief study of some modern compositions will inform us, but the bulk of the course will be the art of writing your own songs. Students will learn how to compose using digital and traditional methods, but in the end will have significant authority in deciding what kind of music they are interested in writing. Students will learn the art of writing a good melody, the art of writing effective harmonies, understanding the texture, layering of multiple parts

in music, analyzing the components of compositions from various genres, the technological aspect of using digital software to compose music including both music production software such as Garage Band or Logic and music notation software such as Finale and the art of lyric writing or being a librettist.

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**Glee Club**

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Students learn the technical aspects of good singing, including breath control, formation of vowel shapes and vocal tone, proper diction in a variety of languages, range extension and agility. Students study repertoire from a variety of genres, from classical to folk to jazz and modern. They perform a capella music as well as music accompanied by piano and orchestra. Through their rehearsal and performances, students learn a valuable skill that can be used as a form of self-expression as well as a powerful form of communication. As the music is being rehearsed daily, various compositional techniques and elements of form are pointed out. Glee Club members participate in service learning through outreach performances. This chorus performs at four major concerts each year, at Haverford, in New York City, and in our community. The Glee Club joins forces with area girls' schools and with Haverford's boy choir to perform works such as Vivaldi's Gloria, Handel's Messiah, and Haydn, Mozart and Schubert Masses. Glee Club is a graded course that meets three times a week before school, 8:00 a.m. - 8:30 a.m. on Monday, Tuesday, Thursday, and Friday.

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**Orchestra**

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Orchestra is an auditioned ensemble. Students must demonstrate satisfactory ability on their principal instrument to participate, as determined by the director. Students learn to phrase artistically, and develop techniques of articulation, expanded dynamic range, and stylistic interpretation through performance of a range of repertoire covering multiple styles and genres. Orchestra members develop ensemble skills such as leading, critical listening, and collaboration. In addition, students refine technical skills on their given instruments. The Orchestra performs during the annual Haverford School performances. Orchestra is a graded course that meets three times a week before school, 7:45-8:20 a.m.

# THEATER

## *Philosophy & Overview*

The purpose of acting, Hamlet tells us, is to hold ‘the mirror up to nature.’ Students of theater at The Haverford School strive to represent most aspects of human behavior in thoughtful, well-prepared performances both in the classroom and on the Centennial Hall stage. Students are encouraged to understand the world by thinking carefully of their own experience, by inhabiting the skins of others, and by studying classic and contemporary drama.

Theater students develop a speaking voice of power and expression. They learn to move with strength and grace. They experience the value of collaboration in large productions including actors, designers, and technicians. They learn to listen to their peers and to carefully critique their work. Most importantly, theatre students develop a physical and emotional confidence to complement their growing intellectual and athletic abilities.

### **Theater I**

Provides students with opportunities to increase self-awareness, develop critical thinking skills, and explore their talents on and off of the stage. The course begins with an overview of public speaking skills. Students put these skills into practice by performing original monologues and scenes from classic American theatrical works. In addition, students learn to incorporate their skills in literary analysis by translating their critical understanding into choices they make as an actor. Participation as audience members at Upper School productions provides excellent opportunities to connect class work to live theatrical plays performed by their peers. Students also learn the basics of design and technical theatre to enhance their understanding of the collaboration that is necessary to bring theatrical works to life. The introduction of stage combat provides an opportunity for the students to understand how their movements can tell the story as well. The course culminates in the production and performance of a stage combat scene.

### **Theater II**

*Prerequisite: Successful completion of Theater I or Recommendation from the Chair of the Theater Department is required.*

Theater II is an intermediate level course which builds on the skills acquired in Theater I. Using scripts from 20th and 21st century plays, students read, discuss and act in works by modern playwrights who are bright examples of the power of drama. Scene study focuses on students taking greater risks in their acting work and performance exercises will also include roles that will stretch the student actor. Individual expression and creativity is also encouraged through dramaturgical projects within the context of each

play being studied. Participation in or attendance at all Upper School productions will be mandatory as a way of studying and experiencing the various tools in action. Theatre II will also travel off campus to view a professional production in order to become discriminating consumers of live theatre. The art of directing is an integral unit in Theater II. Each student will direct a scene from one of the plays read in class. They will concentrate on study of the world of the play, character motivation, implementation of blocking, production history, and most importantly, communicating the action of the scene to their peers. Students also begin sword play as they advance to the next level of stage combat. As a final project, students are required to perform a scene of their choice that incorporates the swordplay skills they have acquired.

### **Theater III\* (spring)**

*Prerequisite: Recommendation from the Chair of the Theater Department is required. Participation in at least one Centennial Hall production prior to the first day of class is required.*

Theater III is an advanced level Independent Study in theatre generally reserved for Sixth Form that incorporates many of the lessons and techniques acquired in Theatre I and II. Students of the class form a production company with the goal of presenting a play for The Haverford School community and general viewing audience. Under instructor supervision and guidance, participants select a play, and cast the show. Each member of the course will also help build the set, procure costumes and props, and will be responsible for the marketing and publicity to promote the show. Professionals from the theatre community are invited to attend performances to give the students valuable feedback. Theatre III gives students an excellent, hands-on experience in establishing and being responsible for their own production company. A focus on playwriting is also optional.

# HEALTH & PHYSICAL EDUCATION

## *Philosophy and Overview*

The primary goal of the Health and Physical Education curriculum is to provide the boys with the framework necessary to develop and maintain a fitness plan that they can utilize for a lifetime. Through the health portion of the curriculum the boys are introduced to the five components of fitness and sound training techniques that will guide them in their quest for a personal fitness plan. Principles of diet and exercise and their effect on wellness are incorporated into this plan to allow the students to integrate this information into their program. Through the physical education curriculum, we aim to provide the boys with a variety of lifetime sports and activities that will give the boys the sport skills necessary to establish a lifetime commitment to a healthy lifestyle. We believe that a sound mind in a sound body is an ideal to aspire to and we strive to instill those values in the young men we teach. We also believe that regular daily activity is essential to a healthy cardio-respiratory system, and we try to have at least twenty minutes of vigorous activity each and every class.

### **Health & Physical Education**

This course is required for all Fourth Form students. The class meets three times per cycle, and is divided into two separate curricula. The physical education portion occupies roughly two thirds of the year, with health education taking up the remaining one third. The physical education course introduces the boys to a variety of activities that will form the basis for their adult fitness program. The five components of physical fitness are applied to these activities to give the boys an awareness of the importance of wellness in their lives. The health portion of the course is devoted to current topics including communicable diseases, cardiovascular disease and cancer, how to develop and maintain health relationships, and certification in cardiopulmonary resuscitation. The current text is *“Get Fit, Stay Fit”* by William E. Prentice.

# HISTORY

## *Philosophy and Overview*

The History Department believes that the study of history and social science is at the heart of a strong liberal arts education and, therefore, vital to the development of the essential qualities of a Haverford School graduate. It is through the study of world in the contexts of time and space that a student can understand how the earth and humankind have come to be as they are today and to foresee how the lessons from the past can guide the interactions between peoples and nations in the future. Our core program is two years of global history followed by an in-depth study of United States history. Subsequent electives allow students to closely investigate topics of particular interest, including those in American and global studies, politics and government, and the Olympic Games. Throughout the program, students increase their curiosity, develop their capacity for critical and creative thinking, and expand their openness to new ideas and different ways of experiencing our common humanity.

The Department emphasizes the development of the following attitudes, attributes and skills:

- Read with an inquisitive, critical mind so as to explore material for authenticity and value
- Think critically so as to arrive at well-reasoned conclusions
- Communicate effectively orally and in writing
- Research effectively using both electronic and printed sources
- Apply sound note-taking, memorization, test-taking and other study skills
- Use technology to maximize learning
- Internalize an ethical, moral compass to guide decisions and actions
- Become a life-long student of history

The Department also recognizes the efficaciousness of using collaboration to educate boys by engaging them in major projects that involve research, writing, debating, and oral presentation skills. Among them are the Archeology Project (Third Form), the World War I Trials (Fourth Form), and the Madison Meetings (Fifth Form).

### **Ancient World History**

This Third Form course is, at its core, an introduction to topics in ancient and classical civilizations. With a strong focus on historical analysis and foundational skills in the freshman year, the course will systematically address: effective reading of texts; note-taking, from both reading and class; writing the analytical essay; research techniques using library tools and methods; interpreting maps and other visual presentations; and making oral presentations, both formal and informal. The format of the course will include seminars, lectures, films/video, project-based learning, and other presentations.

### **Modern World History**

In a survey of world history from the 13<sup>th</sup> century to the present, this yearlong Fourth Form course will ask two intersecting and complementary questions: *what is “modern,” and what processes made/are making the world modern?* The course centers on the development and interaction of western and non-western civilizations over this period, examining significant ideas, events, and persons from the multiple perspectives of political, economic, and social history. The students will approach modern world history both chronologically and thematically, using the six themes of (1) interaction between societies, (2) change and continuity over time, (3) technology and demography, (4) social structure, (5) cultural and intellectual developments, and (6) states and political identities.

The course uses and refines the academic skills taught in Third Form Ancient History. Debates, historical trials (World War I), research papers, analytical essays, reflections, and oral presentations are among the methodologies used in this course.

### **United States History**

This yearlong Fifth Form course covers the breath of American history from colonization to the present. Political, economic, and diplomatic developments are at the heart of the course, but social and intellectual history is covered as well. The course combines a traditional chronological approach with an emphasis on selected themes and topics including: the development of the United States as a world power; the socio-economic, racial, and ethnic diversity of American society; the development of the American political tradition (sectionalism, citizenship); and the role of government in the regulation of the economy. Readings include narrative history, news articles, primary sources, and other supplementary materials.

### **United States History\***

*Prerequisite: Recommendation of teacher*

This is an advanced version of the classic survey course in United States History. The course provides a foundation for a sophisticated appreciation of the history of the United States, beginning with the settlement of the colonies and ending with the present day. Events are studied within the historical contexts of chronology and geography. Students will acquire a critical lens for the understanding of contemporary issues, such as the tension among liberty, equality, and justice. College-level texts, advanced work with primary and secondary sources, and work in historiography are hallmarks of the course. Aside



from preparing boys for success on national examinations, we hope to inspire an active and inquiring sense of citizenship.

### **Advanced Research Program in History\* (*permission of department*)**

The Advanced Research Program in History (ARPH) is designed to offer rising Sixth Form scholars the opportunity to conduct research and write an academic thesis on a topic of their choice. The program is open to students who have demonstrated a sustained interest in history over the course of their careers at Haverford and who are excited to engage in a full year of study, reflection, and writing on a historical topic that is meaningful to them towards the goal of producing an advanced thesis paper. Topics may range from the recent cultural history of R&B to the politics of medieval cuisine (and everything in between) and are only limited by available sources and imagination. ARPH begins in early spring of Fifth Form and ends the following April when the final thesis is due. This half-credit course meets for one or two doubles per cycle from September to April and entails a major commitment to reading over the summer and throughout the school year. Students who apply for this course and are approved by the History Department will sign up during course selection meetings in March.

### **European Dictators\* (*fall*)**

*Prerequisite: A- in American History and recommendation of teacher.*

This is a one-semester advanced course for Sixth Form students. It will focus on 20<sup>th</sup> century Europe between the world wars with special attention to the rise of totalitarianism and the conditions and events that paved the way to power for Benito Mussolini in Italy, Joseph Stalin in the USSR, Adolph Hitler in Germany, and Francisco Franco in Spain. In addition to traditional history books such as *European Dictatorships: 1918-1945*, we will make use of memoirs such as Orwell's *Homage to Catalonia* and Levi's *Christ Stopped at Eboli*, Picasso's *Guernica* and Kampf's *Venus & Adonis*, and films like the Christopher Isherwood-inspired *Cabaret* and Leni Riefenstahl's classic and chilling documentary *Triumph of the Will*.

### **History of Science, Sex, and Culture\* (*fall*)**

*Prerequisite: A- in American History and recommendation of teacher.*

This course will focus on issues of gender and sexuality from the late nineteenth century to the present. With particular attention to how science has transformed understandings of human sexuality, reproduction, and sexual difference, we will consider such questions as: How have biological understandings of male and female bodies changed? How did wars and epidemics change the stakes of sex for families, nations, and medicine? How did race, class, religion, and age inflect discussions about masculinity, femininity, and sex? Topics will include the history of eugenics, public health programs, social movements (i.e. Civil Rights, Women's Rights, Disability Rights, LGBTQ), "the pill", prostitution, Men's health, regulation of pornography, and assisted reproduction. The course will be based on a broad range of interdisciplinary readings, documentary films, and primary sources. This is a project-based class and will culminate in an original final project (paper, exhibit, or documentary film) on a topic chosen by the student.

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**Modern Middle East History (*spring*)**

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This one-semester elective provides an overview of the modern Middle East. This examination includes state and regime formations, international relations, and contrasting domestic politics. Additionally, the course will examine the theoretical roots of Islamic fundamentalism and its effect on the formulation, growth, and actions of radical Islamic terrorist organizations. We also will evaluate contemporary issues surrounding U.S. foreign policy as it pertains to the politics, economics, and conflicts of the Middle East.

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**History of Global Health (*spring; honors option upon permission of instructor*)**

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In this course, we will trace the emergence of public health practices, systems, and ideas from the 19<sup>th</sup> to the 21<sup>st</sup> centuries as a critical part of a broader history of epidemics, empire, and global mobility. We will explore these developments as they emerge at the intersection of Western and non-Western understandings of health, medicine, and the body; imperial health goals; decolonization and development initiatives after World War II; the rise of modern biomedicine and pharmaceutical industries; and the shift from “international health” to “global health.” Over the semester, we will examine themes of commodification, expertise, autonomy, agency, and disability as they emerge in such topics as tropical hygiene, eugenics, biosecurity, sexual and reproductive health, and in the management of diseases ranging from malaria, smallpox, and polio to HIV and Ebola. Students will be required to write short response papers to readings, co-lead a class discussion, and write an op-ed that uses a historical case to help illuminate a pressing issue of global health in the present.

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**History of Sport (*fall or spring*)**

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This course will explore the historical development of sport from ancient times to the present. We will investigate sport as a site in which issues of nationalism, race, class, gender and sexuality were reinforced and also challenged. While the scope of the course is broad, it will primarily focus on key debates and turning points of Western sport the nineteenth and twentieth centuries. Topics will include: violence and sport, sports activism, amateurism vs. professionalism, youth sports pipelines, commercialization of sport, Title IX, performance enhancement and its regulation, and evolving athletic technologies (from the artificial limb to Nike Vaporfly shoes). Beyond reading secondary literature, analyzing primary documents, watching documentary films, and participating in discussions and small projects, each student will also lead a class discussion and perform original research and writing (or create a final multimedia project) on a topic of their choice.

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**Government and Politics (*fall or spring*)**

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This course will present an introduction to the study of government and politics. Our inquiries will begin with the intellectual and historical foundations of the western style of government. From there, we will learn about the organization of our own federal government, including the political forces that dictate its behavior, before discussing various Constitutional issues arising from current demographic, economic, and political trends. Finally, we will analyze the 2020 general elections in depth. This course will make use of various outside experts and speakers and will culminate in a final research project.

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**Modern Black Lives: African American History: 1964-Present (*fall or spring*)**

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This course will explore questions related to the social and historical evolution of the history of Black America following the Civil Rights Movement of the 1960's. So often, African American Studies courses focus on the long period of Enslavement culminating with the legal codes that emanate from the Civil Rights Act of 1964. This course will use poetry, music, art and traditional historical primary sources to build the collective narrative of Modern Black Lives from 1964 to the present day. Anticipated units include: Political Messaging in the Civil Rights Era, Post Civil-Rights Urban Realities, Black Arts Movement (1970s); The Crack Epidemic and The War on Drugs (1980s); Hip Hop Politics (1990s); Black Music in the New Millennium; Black Lives Matter Movement (2010s).

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**Social Psychology (*fall or spring*)**

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This course for Sixth Form students examines the principles of social psychology: that is, how individuals think, feel, and behave in regard to other people and how individuals' thoughts, feelings, and behaviors are affected by others. The course will concentrate on the process of social thinking, such as motivation, leadership, conformity, obedience and persuasion, and social relations, including aggression, altruism, prejudice and attraction. General principles of coping, grouping identities, and social stress will be discussed. In addition to readings from the text, the course will include discussions of "case studies," film presentations and journal writing.

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**Contemporary International Relations (*fall or spring*)**

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The 21<sup>st</sup> century has been characterized by rapid change and increasing globalization, impacting individuals in societies in unprecedented ways and creating complex global political challenges. This one-semester survey course explores the intricacies of how global leaders in the international community must balance past interactions and future projections while making present choices. Using specific case studies and current events, as well as participating in a semester-long online simulation while competing for class credit, students will confront IR concepts in real time. Topics will include different political theories, decision making, the role of international organizations, and major geopolitical moments that have shaped the current world order.

# MATHEMATICS

*It is clear that the chief end of mathematical study must be to make the students think.*

—John Wesley Young

## *Philosophy and Overview*

The Upper School mathematics program sets forth clear, high-quality academic benchmarks that all **students must master by the end of each course. These are designed to exceed the Pennsylvania Common Core Standards** in their respective subjects. The Haverford School's expectations are rigorous, relevant to the real world, and reflect the knowledge and skills our graduates will need to be well prepared for the mathematical challenges in life beyond Haverford.

Each of our courses offers a comprehensive set of learning objectives with the common goal of developing competent problem solvers, effective communicators, independent learners, and confident critical thinkers; these are skills that extend beyond mathematics. We are committed on an ongoing basis to improving the mathematics offerings available to our students. To that end, our instruction and curricula are monitored and adjusted to best serve our charges – the future global citizens of the 21st Century.

## **About Algebra I and Geometry**

Algebra is important as a modeling and problem solving tool, and it bridges the gap from computational mathematics to abstract understanding. Geometry introduces the spatial relationships that exist in two and three dimensions. The concepts learned in these introductory courses are used by each of us every day - albeit unconsciously - and form the foundation upon which subsequent math courses are built.

### **Algebra I**

Algebra I is an introductory course designed for incoming Third Formers who have had little or no algebra or who need a thorough review of basic algebra.

The topics explored during the school year consist of:

- Problem solving skills
- Variables and proportions
- Linear graphs and equations
- Multiple representations of linear situations
- Multiplications of algebraic expressions
- Solving systems of linear equations

- Quadratics, including factoring expressions, graphing functions, and solving equations
- Solving and graphing linear inequalities
- Simplifying rational expressions
- Using laws of exponents
- Using function notation
- Appropriate use of a graphing calculator for the topics listed above

## **Geometry**

This course provides a comprehensive introduction to Euclidean geometry. A solid foundation in Algebra I is required.

The topics to be covered will include:

- Foundations of geometry
- Polygons
- Circles
- Coordinate geometry with transformations
- Inductive and deductive reasoning
- Mathematical proof
- Congruence and similarity
- Area and volume

## **Geometry\***

This course provides a thorough year long study of Euclidean geometry at an advanced level for qualified students from Third and Fourth Form. The course includes all of the foundational components of the standard course. Students will also be expected to connect concepts, and the most successful students will solve problems creatively. A mastery level understanding of Algebra I and a teacher recommendation are required to register for the course.

In particular, the topics to be covered will include (but not necessarily to be limited to) the following:

- A rigorous treatment of mathematical proof
- Justification of the major theorems of the course
- Vectors
- Circle theorems

## About Algebra II

The Haverford School offers two levels of Algebra II - Honors and Standard. The goal of each is to expand and deepen your existing knowledge of Algebra I and Geometry; both courses emphasize the computational and theoretical components of the subject matter. Successful completion of these courses will satisfy the Common Core requirements for Algebra (as set by the Pennsylvania Department of Education) and will prepare students to tackle more advanced coursework in the future.

### **Algebra II**

*Prerequisite: Geometry*

This yearlong, standard level course is intended to meet (and surpass) the Common Core requirements. This is an exhaustive curriculum with particular emphasis on the practical/computational components of the subject and on the use of functions as mathematical models for solving real-world problems.

In particular, the topics to be covered will include (but not necessarily limited to) the following:

- Properties of sets of numbers and number systems
- Solving equations, inequalities and absolute value problems
- Functions, relations, and their graphs
- Combinations and transformations of functions
- Inverse relations and functions
- Linear functions and systems of linear equations
- Quadratic functions and introduction to complex numbers
- Properties of higher-order polynomials
- Radical functions and rational exponents (roots and powers)
- Exponential and logarithmic functions
- Rational functions
- Functions as mathematical models
- Elementary probability

### **Algebra II\***

*Prerequisites: Geometry\* and teacher recommendation OR Standard Geometry with a grade of "A" for both semesters and both semester exams and teacher recommendation.*

This yearlong course covers the topics outlined above, but in a much more rigorous fashion. There are a number of additional topics presented as well. One of the distinguishing features of this course over its standard counterpart is the greater commitment in both time and effort required for success. This course delves much deeper into the theory behind the basics and contemplates a wider range of topics. The curriculum reaches well beyond the Common Core requirements and prepares the students to tackle Precalculus at the honors level the following year.

In particular, the topics to be covered will include (but not necessarily to be limited to) the following:

- Domain and range of functions and their inverses
- Systems of inequalities and absolute value equations
- Families of functions; transformations and graphs; end behavior of functions
- Quadratic equations (using advanced factoring techniques)
- Complex numbers/operations
- Systems of quadratic equations/inequalities
- Exponential and logarithmic functions using  $e$  and change of base
- Rational functions and their graphs – asymptotes, discontinuities, intercepts, roots and end behavior
- Conic sections – transformations and graphs
- Probability (combinatorics) and introduction to statistics (including binomial, geometric and normal distributions)
- Matrices (solving real-world problems with matrices)
- Linear programming (solving real-world problems)
- Functions as mathematical models (using technology/software to solve real-world problems)
- Periodic functions and trigonometry; trigonometric identities/equations

### **Functions, Statistics, and Trigonometry**

*Prerequisite: Algebra II*

This course provides a preparation for the study of Precalculus, geared toward those students needing further review of advanced algebra concepts. First semester topics include functions, transformations, polynomials, and rational functions. Second semester topics include exponential and logarithmic functions, unit circle, basic trigonometry, and an introduction to statistics. Real-world models are developed throughout.

In particular, the topics to be covered will include the following:

- Exploration of data including tables, graphs, and plots, measures of center and deviation
- Functions and models including linear, quadratic, exponential, inverse, cubic and step Functions
- Transformations of graphs and data including translations and scale changes
- Circular functions including radian measure of angles, arc length and sector area, sine, cosine, and tangent and their graphs
- Trigonometric functions including the ratios in right triangles, the Law of Cosines and Law of Sines
- Root, power, and logarithmic functions including  $n$ th root function, rational powers and logarithms

- Probability and simulation including basic principles of probability, counting principles, permutations and combinations, Pascal's Triangle
- Sequences, series, including limits of sequences, arithmetic and geometric series

## About Precalculus

Precalculus builds on the concepts from Algebra and Geometry to create the foundation for the study of calculus and is offered in Standard and Honors levels. This challenging course includes an examination of many types of functions including trigonometric, exponential, logarithmic, rational, quadratic, and higher - order polynomials. Students will be challenged to examine mathematics graphically, algebraically, verbally and numerically. The use of the graphing calculator will be required in this course, and students will be expected to know the five basic graphical functions: minimum, maximum, value, zero, and intersection.

### Precalculus

*Prerequisites: A grade of B or higher in Algebra II and teacher recommendation.*

This course provides a comprehensive preparation for the study of calculus at Haverford or an introductory calculus course in college. This course requires a strong working knowledge of all the material from Algebra II, i.e. of linear, quadratic, higher-order polynomial, rational, exponential, and logarithmic functions. The concepts of trigonometry, sequences and series, and combinatorics will be developed. Mathematical models - solving real-world problems - requiring both algebraic and numerical methods will be emphasized throughout.

Topics to be covered include:

Brief review the following:

- Functions - domains and ranges, graphs, transformations, composition, inverses and their applications
- Polynomial and rational functions with emphasis on the Fundamental Theorem of Algebra and graphical methods
- Exponential and logarithmic functions, their properties and applications
- Trigonometric functions - right triangle trigonometry, unit circle, fundamental trigonometric functions and their inverses, modeling and applications using trigonometry; graphs of sine and cosine functions
- Analytic trigonometry- using and proving trigonometric identities, solving trigonometric equations
- Advanced trigonometric concepts - Laws of Sines and Cosines, sum and difference formulas, multiple-angle formulas
- Introduction to vectors in the plane



- Linear systems and matrices - matrix operations and applications
- Arithmetic and geometric sequences and series
- Binomial expansion, counting principles, elementary combinatorics, introduction to probability theory
- Conic sections - circles, parabolas, ellipses and hyperbolas, their equations and properties
- Introduction to limits and continuity of functions

### **Precalculus\***

*Prerequisite: A grade of "B+" or better in Algebra II\* or "A" or better in Algebra II and teacher recommendation.*

This course covers all of the topics in Standard Precalculus with additional and/or enhanced coverage of conic sections, parametric equations, polar coordinates, vectors and the complex plane. Honors Precalculus is fast paced and requires a mastery of all previously studied skills. Connections with the sciences, economics and other real world applications are developed throughout. This course will also develop the student's skills in the use of the graphing calculator, in all of its modes.

In particular, the topics to be covered will include (but not necessarily to be limited to) the following:

- Advanced trigonometric functions - graphs of tangent, cotangent, secant, cosecant and their inverses; half-angle formulas, product-to-sum formulas
- Advanced applications of conic sections - working from first principles, i.e. definitions of foci, directrices and eccentricity
- Parametric equations - graphs and applications
- Polar coordinates and graphing polar equations
- Vectors and vector operations in 2 and 3 dimensions - dot and cross product, components of vectors, lines and planes in 3-space
- Complex numbers - trigonometric form, De Moivre's Theorem
- Advanced treatment of sequences and series - tests for convergence of infinite series, mathematical induction
- Introduction to calculus - limits, continuity, tangent line to a curve

*The following mathematics courses are primarily for Fifth and Sixth Form students and require departmental approval to enroll.*

## **About Calculus**

Inspired by problems in celestial mechanics, Newton and Leibniz developed the ideas of calculus more than 300 years ago. Since then, each century has extended the power of calculus to illuminate questions in mathematics, the physical sciences, engineering, and the social and biological sciences. Calculus is a powerful tool for reducing complicated problems to manageable procedures.

The Haverford School offers two levels of calculus: Standard and Honors. The goal of both courses is to provide students with a clear understanding of the ideas of calculus as well as provide a solid foundation for subsequent courses. Both courses require a strong working knowledge of material from Algebra II and Precalculus, the ability to work independently, and include both computational and theoretical components.

### **Calculus**

*Prerequisite: A final grade of "B+" in Precalculus or the recommendation of your current teacher.*

Calculus begins with a brief review of functions including logarithmic, exponential and trigonometric. After developing the ideas of limits and continuity, the course will focus on the major concepts of differential and integral calculus. Students will learn methods for taking derivatives and antiderivatives and use these methods in various applications. Although not as theoretical as Calculus I\*, this course requires a strong working knowledge of previous courses, the ability to work independently, and a desire to learn higher mathematics. The students will use the graphing calculator as well as various online resources.

In particular, the topics to be covered will include (but not necessarily limited to) the following:

- Limits of functions-- graphically and algebraically
- Definition of derivative-- instantaneous vs. average rate of change; slope and equation of the tangent line
- Differentiation techniques-- polynomials, trigonometric, and transcendental functions; implicit differentiation
- Applications of derivatives-- displacement, velocity, and acceleration; optimization; related rates
- Integration-- Riemann sums, definite and indefinite integrals, u-substitution
- Applications of integration-- area under and between curves; accumulation

**Calculus I\***

*Prerequisite: A grade of "B" or above in PreCalculus\* and teacher recommendation OR a final grade of "A" in PreCalculus and teacher recommendation.*

This course is a thorough and challenging development of differential and integral calculus. In addition to numerous applications, this course includes a theoretical component and advanced methods of differentiation and integration that will not be covered in Standard Calculus. This course will prepare students to take Calculus II\* at THS or move into a more theoretical calculus course in college, such as those required for mathematics, engineering or applied science majors. It is anticipated that students, having successfully completed Calculus I\*, may successfully sit for the Calculus AB Examination in the spring.

In particular, the topics to be covered will include (but not necessarily to be limited to) the following:

- Limits of functions-- graphically and algebraically
- Definition of derivative-- instantaneous vs. average rate of change; slope and equation of the tangent line
- Differentiation techniques-- polynomials, trigonometric, and transcendental functions; implicit differentiation
- Applications of derivatives-- displacement, velocity, and acceleration; optimization; related rates
- Integration-- Riemann sums, definite and indefinite integrals, u-substitution
- Applications of integration-- area under and between curves; accumulation
- Differential equations
- Slope fields
- Exponential growth and decay models
- Simpson's Rule, Trapezoid Rule
- Additional integration techniques, integration by parts
- Volumes of revolution, disc, shell, and washer methods

**Calculus I with Engineering Applications\***

*Prerequisite: A grade of "B" or above in PreCalculus\* OR a final grade of "A" in PreCalculus. A grade of "B" or above in Chemistry\* or a final grade of "A" in Chemistry. Enrollment contingent on recommendations from current teachers and permission of the Math and Science Chairs.*

This course is a thorough and challenging development of differential and integral calculus with a specific focus on engineering applications. It is designed for students who are seriously considering any engineering discipline as a college major. This course will include a theoretical component and advanced methods of differentiation and integration that will not be covered in Standard Calculus. Students will also complete an applied component that requires them to prepare calculation-based designs, build working prototypes to gather and analyze data, and/or test engineering solutions. Projects will address engineering

problems relevant to practicing engineers and adhere to specific design and economic constraints. Students should **expect** frequent and challenging assignments and projects throughout the course.

Completion of the course will prepare students to take Calculus II\* at THS or move into more theoretical calculus courses in college, such as those required for mathematics, engineering or applied science majors. It is anticipated that students, having successfully completed Calculus I with Engineering Applications\*, may successfully sit for the Calculus AB Examination in the spring.

### **Calculus II\* (fall)**

*Prerequisite: Calculus I\* and teacher recommendation.*

This is a rigorous and fast paced one semester course which builds on the foundation of Calculus I\*. Topics covered include applications of differential equation to physics, engineering, and biology, infinite series, parametric and polar representation, and the foundations of vector calculus. It is anticipated that students, having successfully completed Calculus II\*, may successfully sit for the Calculus BC Examination in the spring.

In particular, the topics to be covered will include (but not necessarily to be limited to) the following:

- Differential equations--separable equations, slope fields, Euler's Method, first-order equations and integrating factors
- Sequences and series--limits of sequences, numerical series, power series, Taylor series
- Parametrically defined curves - slope and arc length
- Polar curves--slope and area in polar coordinates
- Vector-valued functions--position, velocity, and acceleration in the plane

## ***Mathematics Electives***

### **Advanced Topics in Mathematics\* (*spring*)**

*Prerequisite: Grade of B or higher in Calculus II\**

In this semester course we will explore the foundations of linear algebra and multivariable calculus, interweaving topics drawn from both subjects. We will begin with a study of three-dimensional vectors, continue on to matrices and determinants, and conclude with a treatment of functions of several variables, including partial differentiation, gradient and directional derivative, optimization, multiple integrals, and vector analysis. Applications will be drawn from physics, economics, and engineering.

### **About Statistics**

In a society inundated with information, the ability to analyze and interpret data is an invaluable tool. Statistics provides the opportunity for students to learn how to make good decisions with data. Statistics permeates every branch of the natural and social sciences, and the ability to make inferences from statistical analysis is crucial in business, economics, political science and medicine. It is very likely that you will be required to take a statistics course in college and then use it in your career. The Haverford School offers two levels of statistics: Honors and Standard. Both courses are designed to meet (and exceed) the Data Analysis Core Curriculum requirements (as adopted by the Pennsylvania Department of Education); both will include computational and theoretical components dealing with descriptive and inferential statistical techniques. Students will be introduced to the major concepts and tools for collecting, analyzing and drawing conclusions from data. Students are exposed to four broad conceptual themes:

- Exploring Data: Observing patterns and departure from patterns
- Planning a Study: Describing what and how to measure
- Anticipating Patterns: Producing models using probability theory and simulation, and
- Statistical Inference: Confirming models.

### **Statistics**

*Prerequisite: Completion of Precalculus with a grade of B or Precalculus\* and a teacher recommendation.*

This yearlong course is intended to provide students a framework to think about the world “statistically.” Real-world problems will be solved using 21<sup>st</sup> century methodologies, i.e. by incorporating useful technologies and working collaboratively; the process will be project-based, highly interactive, and engaging. This course is open to Fifth and Sixth Form students. It is ideally suited for students who have completed FST or Precalculus and are now looking to expand their mathematical horizons. The course utilizes an online textbook for readings and exercises.

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**Statistics\***

*Prerequisite: Completion of Precalculus with a grade of B+ or Precalculus\* and a teacher recommendation.*

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This is a yearlong comprehensive survey of the foundations of probability theory and statistical methods for collecting, organizing, displaying, analyzing and drawing conclusions from data. Emphasis is placed on clear and accurate reporting of the results obtained from these activities. Statistics\* is a demanding course (both in time commitment and complexity), open to qualified Fifth or Sixth Form students who wish to study statistics at a level comparable to a rigorous college course. It is anticipated that students, having successfully completed Statistics\*, may successfully sit for the AP Examination in the spring. Technology will be used extensively for solving problems in the course. No specific textbook shall be required (although classroom copies of *Stats: Modeling the World* by: Bock, Velleman & De Veaux will be available for reference). Students may take this course concurrently with Calculus, Calculus I\* or Calculus II\*.

**About Finance and Economics**

Making sound financial decisions is an essential life skill, yet most people acquire it only with age and through a process of trial and error. Studying Finance and Economics will equip students with powerful mathematical and decision-making skills to help them take control of and proactively map their lives in an uncertain world. Clear financial and economic thinking will yield benefits for students of these subjects, as well as for society-at-large.

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**Finance: Theory of Interest (*fall*)**

*Prerequisite: Algebra II*

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Open to Sixth Form students, this course explores the theories and applications of both simple and compound interest. We will learn the basics of general annuities and perpetuities; amortization tables and sinking funds will be developed; bonds and equity instruments will be compared and contrasted, and capital budgeting will be discussed. In addition to valuing various financial securities using both simple and compound interest, this course analyzes current events and their impact on the markets. A major goal of the course will be to teach students effective problem-solving techniques using real-world transactions. Technological solutions to all of the problems will be emphasized. No specific textbook shall be required (although classroom copies of Schaum's Outline - *Mathematics of Finance* will be available for reference). Theory of Interest is offered in the fall as a stand-alone course; taking Portfolio Analysis in the spring is not required, although it is desirable.

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**Finance: Portfolio Analysis (*spring*)**

*Prerequisite: Algebra II*

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Open to Sixth Form students, the main objective is to provide students with a sound understanding of the concepts and practices associated with making sound investments. We will contemplate topics such as: financial statements, financial instruments, the markets and related indices, risk and return vs. pricing theory, performance evaluation, and efficient diversification. A wide variety of securities will be discussed.

Among them are: common stocks, bonds, mutual funds, real estate, options and tax-advantaged investments. The capstone project for the course will be the design, construction, and management of a hypothetical portfolio by the students. This course additionally examines the impact of current events on a weekly basis. Students will evaluate various current events and examine the positive or negative results on stock price, market indices, and the economy as a whole. All of the required reading material is available online, so no specific textbook will be utilized. Portfolio Analysis is offered in the spring as a stand-alone course; taking Theory of Interest in the fall is not a prerequisite, although it is helpful.

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**Economics: Macro\* (fall)**

*Prerequisite: Students must be enrolled in or have completed a Calculus course.*

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This conceptually challenging Sixth Form elective covers the main ideas of macroeconomics, the study of the large-scale structure of the national and world economy. The mathematical level is comparable to that of an introductory college class in macroeconomics. Topics include national income accounting (GDP), economic growth, unemployment and inflation, the financial sector, money and banking, aggregate supply and demand, fiscal and monetary policy, and international finance.

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**Economics: Micro\* (spring)**

*Prerequisite: Students must be enrolled in or have completed a Calculus course.*

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This mathematically demanding Sixth Form elective covers the main ideas of microeconomics, the study of the decision-making processes of consumers and producers in a market economy. The mathematical level is comparable to that of an introductory college class in microeconomics. Topics include market equilibrium, elasticity, taxes and price controls, international trade, consumer and producer decisions, competition and monopoly, and externalities, such as pollution and global climate change.

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**Logic (Fifth and Sixth Form)**

*Prerequisite: Pre-Calculus, or concurrent Pre-Calculus with recommendation of teacher*

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This quarter long course introduces students to methods of reasoning, inference, and argument. It is open to all students who wish to improve their abilities to think carefully and critically with respect to any claim with which they are confronted, whether that be claims of societal significance such as those pertaining to civic, economic, or political outcomes, or of cultural aesthetics such as those pertaining to art, food, and sports. Not only will students have the opportunity to develop and practice their analytical thinking skills, but they will also develop their understanding of the concepts, systems, and processes of logic and their metacognitive awareness of thought patterns and habits (both their own and others). Students will find many parallels between the methods developed in this course and the equation solving processes of Algebra and the proof processes of Geometry, as well the use of formal abstract language to generalize arguments and derive structure from repeated patterns. More specifically, students will learn the foundational principles of proof techniques that they may have seen in their core math courses such as Proof by Induction and Proof by Contradiction. In particular, students will learn to:

- contrast the nature of arguments from that of explanations, opinions, and beliefs,
- understand the principles of deduction vs induction including the conditions of validity and soundness
- identify and define logical fallacies
- make claims of equivalence and inference based categorical propositions and class using tools such as Venn Diagrams and the Boolean Square of Opposition
- apply the language of symbolic logic in formal proofs of validity

### **Math Modeling to Solve Social Challenges (*Fifth and Sixth Form*)**

*Prerequisite: Algebra II, or concurrent Pre-Calculus with recommendation of teacher*

This quarter long course introduces students to the concepts and techniques of mathematical modeling. The course is designed to answer the fundamental question, “How can I use mathematics to better understand and solve real-world social challenges?” The course draws from skills students have acquired across all of their math experiences including those in Algebra, Trigonometry, Statistics, and some ideas of Calculus, though students need only have a strong working knowledge of material from Algebra II. More broadly, students will develop their abilities to:

- make sense of real-world problems,
- state and build from valid assumptions,
- target desired outcomes and define variables,
- use mathematical techniques to find solutions,
- analyze and model results,
- report conclusions and use the evidence they have acquired to argue compellingly a position

The course will address real-world social challenges such as housing disparities, food insecurity, educational outcomes, and equitable resource distribution.

### **Software Programming I (*fall and spring*)**

*Prerequisite: Algebra II*

The course focuses on the software development life cycle through exploring and utilizing the Python programming language. Students will have the opportunity to develop their own projects. They will be responsible for determining the scope of a project, design a solution, program the application, test and debug. It is expected that students will master algorithm building and develop their understanding of the object oriented nature of Python. Three to four hours of work per week dedicated to practicing and mastering this material can be expected.



**Software Programming II (spring)**

*Prerequisite: Teacher recommendation and completion of SPI with a B or higher. Students must demonstrate a strong work ethic and a history of consistent homework and project completion to qualify.*

Students will learn to identify interesting problems that can be addressed with software. They will explore Python's usage of classes and objects and use them in programs they build. Working as a collective is an essential skill for future programmers and students taking this course will learn to develop this skill and practice it regularly.

**The following course progression may be used to determine your plan for each year.**

**Although not included in the chart, math electives are also available in Forms V and VI.**

Form II	Form III	Form IV	Form V	Form VI
PreAlgebra	Algebra I	Geometry	Algebra II	Functions, Statistics, and Trigonometry or PreCalculus
Algebra I	Geometry	Algebra II	PreCalculus	Calculus or Statistics or Statistics*
Algebra I	Geometry*	Algebra II*	PreCalculus*	Calculus I* and/or Statistics*
Geometry	Algebra II	PreCalculus	Calculus	Calculus I* or Statistics* or Statistics
Geometry	Algebra II*	PreCalculus*	Calculus I*	Calculus II* and/or Statistics*

# MODERN & CLASSICAL LANGUAGES

## *Philosophy and Overview*

The Modern and Classical Languages Department prepares boys to be leaders and citizens in their local, national, and global communities, where a command of multiple languages is not simply beneficial, but necessary. Our faculty engages students using traditional and modern methodologies rooted in the following interconnected principles:

**Cross-cultural engagement and empathy:** Learning a new language affords students the unique opportunity to gain perspective on cultures that differ in place and time. Simultaneously, understanding another language and culture encourages them to reflect on and better appreciate their own. Our collaborative program motivates boys to be open, inclusive, and empathetic.

**Language acquisition:** We aspire towards boys achieving proficiency in listening, speaking, reading, and writing in their respective languages while reaching the rigorous linguistic standards that we uphold. Our faculty fosters cross-cultural communication, inspires intellectual risk-taking, and instills confidence in students to navigate unfamiliar discourse.

**Authentic experience:** Our classes contextualize language study by incorporating meaningful and authentic resources. We value and intentionally provide immersive experiences that align with our curriculum and partner with the Global Studies program for students to connect with communities locally and abroad.

## ***Chinese Program***

Communicative language skills are the foundation of our Chinese program. By emphasizing listening and speaking followed by reading and writing, students accumulate common words and phrases quickly at the introductory level. Thematic units that emphasize real-life situations, such as ordering food, traveling, or making plans with friends, help students develop skills they can use immediately, as well as build a foundation to continue their studies in college and beyond.

## ***Latin Program***

The study of Latin at Haverford centers on the literature, history, and culture of the ancient Greek and Roman worlds. After learning the key vocabulary and grammatical structures of Latin, students move on to experience a set of classical texts that have shaped Western culture, and continue to shape our world today.

## ***Spanish Program***

The humanity of past and present Spain and the Americas and the study of those cultures undergirds our Spanish program. The students' acquisition of linguistic structures and new vocabulary builds the foundation for future immersion in the target language and growth into level-appropriate literature study, story creation, text analysis, and authentic oral dialogue.

## ***Second Language Option***

Upper School students are permitted to take two languages. Students seeking two languages should discuss this option with their current language teacher, their advisor, and the Language Chair.

## **Chinese I**

This introductory course is offered to students with little or no prior experience in Mandarin Chinese. Basic background information of the language such as tone graphs, pinyin, and formation of characters will be introduced. Vocabulary, grammatical structures, and cultural references will be taught and discussed at an elementary level. Students will learn to read simple passages and write in simplified Chinese characters. In the second semester, students will engage in basic communicative tasks related to daily settings. This course is mostly conducted in Chinese, with the exception of addressing important and difficult concepts.

## **Chinese II**

*Prerequisite: successful completion of previous level and department approval.*

This course continues to build on skills, comprehension and proficiency developed previously in Chinese I. More vocabulary and grammatical structures will be introduced. Students will be equipped with the ability to communicate with native speakers in everyday settings and sustain meaningful conversations. Emphasis will be placed on performing culturally authentic and pragmatic communicative tasks.

## **Chinese III\***

*Prerequisite: successful completion of previous level and department approval.*

This course continues to build on skills, comprehension and proficiency developed previously in Chinese II. More vocabulary and grammatical structures will be introduced. Students will be equipped with the ability to communicate with native speakers in everyday settings and sustain meaningful conversations. Emphasis will be placed on performing culturally authentic and pragmatic communicative tasks. Chinese is the main medium in the classroom and in casual situations throughout the school day.

## **Chinese IV\***

*Prerequisite: successful completion of previous level and department approval.*

This course continues to refine students' listening, speaking, reading and writing skills previously developed in Chinese III\*. Conversations and discussions will be based on socially and culturally authentic context and materials. Students will learn to compose descriptive passages using advanced vocabulary, sentence structures, and both traditional and up-to-date idioms that have substantial reflection on Chinese current affairs. Toward the end of the course, students will learn about contemporary China through Chinese cinema and ancient Chinese philosophy and its modern application

### **Latin I**

This introductory course examines the linguistic, cultural and historical traditions of the Greco-Roman civilizations. As a way to foster clear and logical thinking, Latin grammar, syntax and translation form the core of study. Since Latin is a basic constituent of the English language, the course examines vocabulary with particular emphasis on English derivatives and related definitions. Students also study mythological, historical and cultural themes in order to broaden their appreciation of the foundations of Western civilization.

### **Latin II**

*Prerequisite: successful completion of previous level and department approval.*

This course, offered to students who have completed Latin I in the Middle or Upper School, reviews the fundamentals of Latin I and introduces more sophisticated grammatical concepts requisite for success at the intermediate level. To introduce the art of translation, fables and mythological stories are read, as well as adapted selections from ancient literature. Emphasis is placed on precise analysis and expression in preparation for reading the original works of the Latin writers in Latin III.

### **Latin II\***

*Prerequisite: A in Latin I and department approval.*

Students who choose this course should be especially eager to continue their study of Latin and classical literature. While including the elements described for Latin II, the pace and depth of the curriculum are aggressive and presume an avid enthusiasm for scholarship. Students will complete the majority of Latin grammar while reading and translating extensive selections from classical and medieval literature. In addition, students will study the history and culture of ancient Rome in depth, using archaeological and epigraphic as well as literary sources.

### **Latin III**

*Prerequisite: successful completion of previous level and department approval.*

This course continues with the mastery of sophisticated grammatical concepts which are studied in the context of historical writings. With the text Duces Romanorum the students examine ancient Rome with an emphasis on its greatest leaders from its founding through the Republic. In the spring, particular emphasis will be placed on the works of Caesar.

### **Latin III\***

*Prerequisite: B in Latin II\* and department approval*

This course allows the student to apply his knowledge of Latin grammar, syntax and vocabulary to the reading, translating, analyzing and understanding of Latin literature from the late Republic. Particular

emphasis will be placed on the works of Caesar and Cicero. In conjunction with our translations, students will study the literary, cultural, intellectual and historical contributions of the ancient Roman world. This course, in comparison with the Latin III course, proceeds at an enhanced pace and depth. .

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**Latin IV**

*Prerequisite: successful completion of previous level and department approval.*

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Students study the traditions of ancient epic by reading the Iliad, its ancient Latin translation, the Ilias Latina, and Vergil's epic poem The Aeneid. Selections are translated from the Latin, while other passages are examined and discussed in English. In addition to mastering Latin epic meter, students become familiar with Latin poetic style and its place in the Western literary canon . Through extensive translation and textual analysis, students develop their confidence in reading at sight and, by writing short papers and giving oral reports on relevant topics, they enhance their appreciation of poetic artistry.

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**Latin IV\***

*Prerequisite: B in Latin III\* and department approval.*

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Students study Vergil's epic poem the Aeneid in its historical setting as well as in its place within the traditions of epic genre. Selections are translated from the Latin, while other passages are examined and discussed in English. In addition to mastering Latin epic meter, students become familiar with figures of speech and Vergil's unparalleled poetic style. Through extensive translation and textual analysis, students develop their confidence in reading at sight and, by writing short papers and giving oral reports on relevant topics, they enhance their appreciation of Vergil's artistry. This course, in comparison with the Latin IV course, proceeds at a greatly enhanced pace and depth.

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**Latin V\* Prose (fall)**

*Prerequisite: department approval, B in Latin IV\* or successful completion of Latin IV.*

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In this course students will have the opportunity to read and study a variety of Roman prose writings including history, political commentary, philosophy and letters. The works of authors such as Livy, Tacitus, Suetonius, Caesar, Cicero and/or Pliny will provide the basis for a more thorough understanding of the Roman Republic and Empire. The prose selections will enable students to improve both their reading fluency and literary analysis skills as they gain a better appreciation of Roman culture, history and literature.

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**Latin V\* Poetry (spring)**

*Prerequisite: department approval, B in Latin IV\* or successful completion of Latin IV.*

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In this course, students will have the opportunity to read and study a range of Roman poetry including epic, lyric and satire. The works of authors such as Ovid, Catullus, Martial and/or Juvenal will offer the student insights into Roman thinking about politics, love, everyday life, mythology and poetry. The

poetry will enable students to improve both their reading fluency and literary analysis skills as they gain a better appreciation of Roman culture, history and literature.

### **Spanish I**

This course is designed for the student who has had little or no prior exposure to the Spanish language. It emphasizes the acquisition of fundamental practical vocabulary, a solid foundation in basic grammatical structures, a detailed study of the verb system and the development of sound pronunciation and speaking skills.

### **Spanish II**

*Prerequisite: successful completion of previous level and department approval.*

Students enrolled in this course have successfully completed Haverford's first year of the language. In Spanish II, students will continue to build a solid foundation in the fundamentals of grammar and in the acquisition of a practical, useful, contemporary vocabulary for oral and written communication in a variety of everyday situations. Furthermore, through various cultural explorations, students will continue to expand their knowledge of Hispanic cultures. Students participate in daily oral drills, complete translation exercises, read short passages and write one-page compositions. Throughout the year, the students continue to expand their vocabulary and strengthen their precision both in speaking and writing, and gain mastery of the future, conditional, imperfect and perfect tenses.

### **Spanish II\***

*Prerequisite: A average in Spanish I and department approval.*

Students enrolled in this course have successfully completed Haverford's first year of the language, and are prepared for the significantly faster pace of this course. Students in this class will master the future, conditional, imperfect and perfect tenses of the indicative mood, and will also undertake a thorough study of the present subjunctive. The class will be conducted almost entirely in Spanish, unless the explanation of a complex grammatical concept demands otherwise. Students will engage in oral drills, and translation exercises, and will create presentations and one-page compositions. The class will read and discuss short literary passages and current articles relevant to Hispanic culture.

### **Spanish III**

*Prerequisite: successful completion of previous level and department approval.*

Students enrolled in this course have successfully completed Haverford's Spanish II curriculum. Spanish III begins with a thorough review of grammar covered in the second year. Students will then continue their study of more complex grammatical structures. Students will read longer passages, and sections of authentic literary works, and will engage in class discussion primarily in Spanish. In Spanish III, students

complete their study of the Spanish verb system, and begin to apply their skills to a variety of exercises designed to promote greater fluency in spoken and written Spanish.

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**Spanish III\***

*Prerequisite: B average in Spanish II\* and department approval.*

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This course is designed for students who have successfully completed Haverford's Spanish II\* curriculum. Emphasis in Spanish III\* is divided among five basic language skills: listening comprehension, speaking, reading, writing, and cultural understanding. This third-year course begins with a review of second year skills and introduces appropriate new material to help students improve their command of grammatical structures, active and passive vocabulary, and comprehension of both literary and non-literary written Spanish. Short stories, films, and newspaper articles are incorporated into the curriculum, in order to foster greater understanding of Hispanic culture, and to help the student develop the skills necessary to express himself in spoken Spanish. Students in Spanish III\* make the transition from sequential materials used at the previous levels of language instruction to the ability to express themselves creatively in oral and written Spanish.

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**Spanish IV**

*Prerequisite: successful completion of previous level and department approval.*

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The objective of this course is to help the students to convert the linguistic skills acquired during the three previous years into a coherent, clear, and useful means of communication. It prepares students to converse at length and handle everyday situations with confidence. Students view films in Spanish, and read literary works from world-renowned Spanish and Latin American authors. They also use the Internet, magazines and newspapers to read about current events in the Spanish speaking world. The films, literary readings and articles are the basis for classroom discussion and provide students with a general understanding and appreciation for the Hispanic culture. By the end of this course the student should have developed the self-assurance and confidence necessary for using the target language in informal conversations, or before a variety of audiences, ranging from a small circle of friends to a full class.

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**Spanish IV\***

*Prerequisite: B average in Spanish III\* and department approval.*

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This is an interactive course involving advanced vocabulary and grammatical structure, as well as intensive study and usage of the Spanish language. Students in this class will continue to develop greater proficiency in all four language skills: listening, reading, writing, and speaking. Students in Spanish IV\* will discuss contemporary news, cultural topics, literary readings, and films in Spanish. The goal of this course is to help students achieve fluency, and, as such, it will enable students to communicate with greater confidence, giving them the tools they need to handle day-to-day situations in a contextualized setting.



**Spanish V: Cine del mundo hispano (fall)**

*Prerequisite: successful completion of previous level and department approval.*

This course addresses themes relevant to the 21st century in the Hispanic world, many of them polemic in nature. Topics include immigration, oppressive government regimes, global responsibility and regionalism versus globalization. Students learn the skill set necessary to watch, understand and interpret Hispanic film and ultimately enabling the students to view films critically and as empathetic global citizens. Advanced grammar and vocabulary will be reinforced through discussion and composition.

**Spanish V: Conversación y Controversia (spring)**

*Prerequisite: successful completion of previous level and department approval..*

In this semester-long course, students will explore global issues through the literature, art, history, politics, film, and culture of the Spanish-speaking world. Particular emphasis will be placed on developing speaking skills, but students will be required to complete nightly readings in order to participate effectively in class. Readings will be aimed at helping students develop cultural empathy and an understanding of current world events, and will include newspapers, blogs, and other internet sources, as well as literary works. In addition to daily class participation, students will be expected to work individually and in groups on diverse oral projects such as podcasts, Powerpoint presentations and debates. Additionally, several films will be chosen to complement the themes of the texts explored in class.

**Spanish V\*: Latinoamérica en el siglo XX (fall)**

*Prerequisite: B average in Spanish IV\* and department approval.*

This advanced class will use the literature, art and film of the last century to explore the role of political and economic events in the Spanish-speaking world, in particular the political changes, economic crises and social movements that have influenced and affected countries such as Chile, Guatemala, Venezuela, Cuba, Argentina and México. The content of this course will be tailored to student interest and current events. Students will be exposed to the unique voices of short story writers, journalists, poets, artists and filmmakers whose work was informed by these events. Students will also gain insight into the socio-political antecedents and repercussions of these critical events.

**Spanish V\*: Literatura y cultura latinoamericana (spring)**

*Prerequisite: B average in Spanish IV\* and department approval.*

In this course students will explore Latin American culture through literature. The short stories of such authors as Rulfo and Márquez will transform the reader's understanding of the human experience. This advanced course is dedicated to reading and interpreting literature of the Spanish speaking world with particular emphasis on the short narrative. Immersed in the target language, students will participate actively in discussions and write reflections on literary and social justice topics. Students will explore the historical, cultural, and literary influence of various authors from all over Latin America and Spain through the 21st century.

## ***Classics Electives***

### **Ancient Greek**

*Prerequisite: department approval.*

This course will endeavor to immerse the student in the rich intellectual, cultural, historical and literary heritage of ancient Greece, with particular emphasis on Athens in the fifth century BC. Through daily reading of ancient Greek, the students will gain mastery of grammatical concepts, acquire a substantial, working vocabulary and attain proficiency in translation. Initially reading Greek passages adapted from such Classical authors as Herodotus, Thucydides and Aeschylus, by the end of the course we will be reading those same authors in the original. We will also be exploring additional literary traditions by reading several Greek tragedies in translation. The students will be encouraged at all times to examine and reflect upon the myriad of contributions that the ancient Greeks have made to Western Civilization.

### **Mythology (*fall or spring*)**

Though we are separated from the ancient Greeks by millennia, Greek mythology continues to play an important role in shaping and understanding our culture. In this class, we will become familiar with major stories and themes from Greek myths, as well as examine how myths are structured, how people use myths to understand their experiences, how societies apply myths to political purposes, and how myths are depicted in ancient and modern art. No knowledge of Latin is necessary to enjoy and succeed in this class. [This is a Classics course. Knowledge of Latin is **NOT** required.]

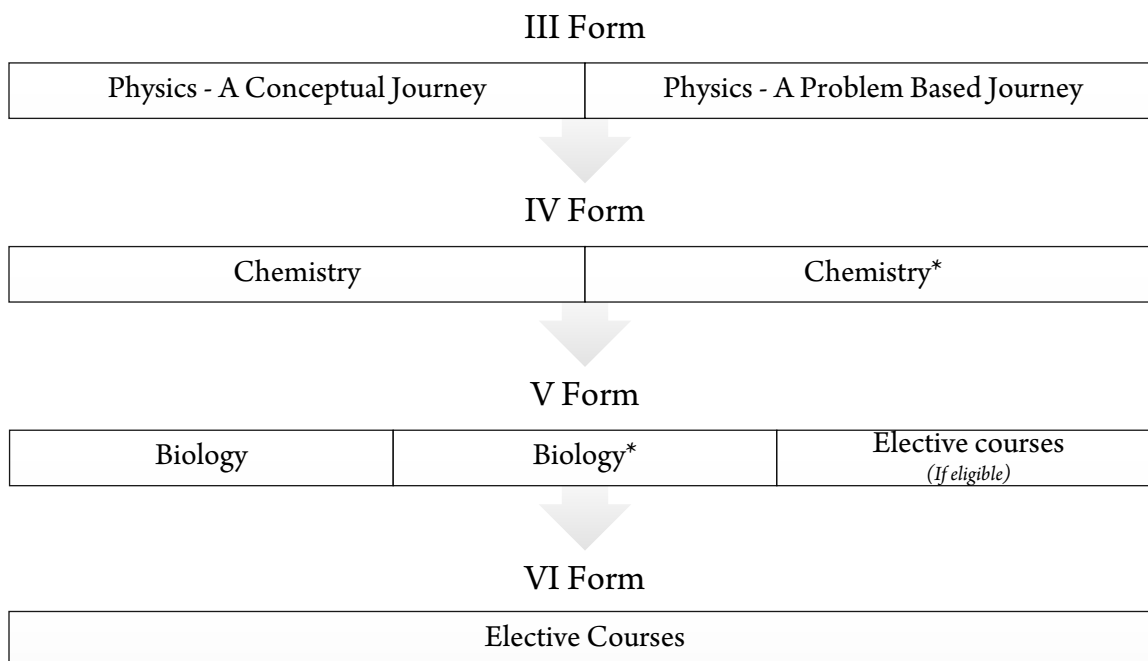
# SCIENCE

## *Philosophy and Overview*

The Haverford School Science Department strives to produce graduates who can synthesize, analyze, and think critically about concepts within the realm of science and across disciplines. We want to develop men who understand that science is an active and ongoing process and emphasize their responsibilities as global citizens, including but not limited to the stewardship of their environment, ethical decision making, and possession of varied perspectives.

We mold active learners who are capable of independent, cooperative, and collaborative work using the available technology and tools. We model and instill personal qualities that will sustain open-mindedness, creativity, imagination, and curiosity. We cultivate persevering, hard-working students who possess the confidence and resiliency to continue their study of science regardless of obstacles they may encounter. Through our courses we hope to nurture and help the boys to sustain the inherent awe, passion, and wonder that science can inspire.

## *Course Progression*



## Core Courses

### Physics

The Haverford student sets out on his Upper School science journey with an exploration of fundamental physics, which lays the foundation for in-depth explorations of chemistry and biology in later years. Third Form students will have a choice between a conceptual or a problem-based approach. The two physics courses are designed around a project-based curriculum and strive to be the cornerstone in our development of scientifically literate graduates. Both courses are structured around pillars of physics such as Newton's Laws, the Law of Conservation of Energy, and electricity and magnetism. Both approaches provide the student with the opportunity for intellectual investigation, tactile experience, and the development of appropriate and vital critical thinking and problem-solving skills. The students will engage in laboratory research, reading, writing, problem-solving, and creative projects, both individually and collaboratively. Both courses will provide a thorough and challenging exploration of fundamental physics while providing the student with the opportunity to master the essential mathematical skills needed for success in both levels of Fourth Form chemistry.

#### **Physics – A Conceptual Journey**

*Prerequisites: None*

This physics course is conceptually challenging while supporting development of essential problem-solving skills. Detailed, challenging, and in-depth projects, modeling, and collaborative experiences will be the primary modes of exploration with the intentional and appropriate incorporation of mathematical principles. Third Form students will have the opportunity to develop or reinforce their mathematical problem-solving skills at the Algebra I level. Physics concepts will be explored through the perspective of how they relate to real world problems and issues. Mathematical and problem-solving skills will be incorporated as needed within the context of the conceptual foundation that forms the fundamental structure of the course. It is designed to challenge each boy to stretch and grow through scientific inquiry, collaboration, concept mastery and appropriate mathematical applications.

#### **Physics – A Problem Based Journey**

*Prerequisites: Concurrent enrollment in Geometry\* or higher or permission of the Department Chair.*

This course is designed to build the same foundation as the conceptual journey with an emphasis on a deeper and broader mathematical exploration. Mathematical concepts will be essential in forming the basis of the conceptual foundation in physics. It is designed with the intent of offering those boys who really enjoy the challenges of establishing a clear and lasting connection between the conceptual foundation and the mathematics that predict and define their physical experiences in the world around them.

## Chemistry

Chemistry is the second of three required courses and is an integral component of the Upper School science sequence. Like Physics, it emphasizes problem-solving strategies, experimentation, teamwork, projects, and the fundamental principles of physical science. To that foundation it adds an understanding of modern theoretical concepts, relationships between structure and function, multi-step calculations, and qualitative and quantitative laboratory work. Chemistry provides students with an understanding of atomic and molecular structure, periodic properties of elements, reactions, stoichiometry, thermochemistry, solution chemistry, acids and bases, and equilibrium. We expect students who have completed a course in chemistry to have a firm grounding in experimental procedures, calculations, basic error analysis, and lab report writing skills. Calculators and computers with related software are frequently used for problem solving and data analysis.

### Chemistry

*Prerequisites: Successful completion of Third Form Physics.*

This is a broad introduction to, and overview of, the general principles and problem-solving techniques in the study of the composition of substances and the changes these substances undergo. The course focuses on building a solid and thorough foundation of fundamental chemical principles through a project-based curriculum. A high value is placed on students engaging in challenging laboratory and collaborative in-class activities. Individual reflection on their experiences is an essential component in support of the acquisition of disciplinary knowledge and skills. In this context, real world phenomena are used to frame student experiences and serve as the basis for the curriculum. Students are assessed both formatively and summatively on classroom participation and content application and mastery with a focus on developing cooperative learning skills. The course touches on all five major branches in chemistry: inorganic, organic, analytical, physical, and biochemical.

### Chemistry\*

*Prerequisites: Final grade of A or better in Third Form Physics and endorsement of the Physics instructors, with the approval of the Science Department Chair. Student must be co-enrolled in Algebra II or higher.*

This fast moving and very challenging course covers the topics in Chemistry with an added emphasis on more complex and mathematically intense problem-solving techniques, independent learning, and detailed applications to contemporary science and technology. Topics will be explored in more depth and at a faster pace than in Chemistry, and students may explore additional topics in Thermodynamics, Electrochemistry, and/or Reaction Kinetics. Students should expect frequent and challenging out of class assignments for its entirety.

## Biology

Biology, taken in the Fifth Form, is the last of the science requirements for graduation. The course takes advantage of the experience students have acquired in their earlier physics and chemistry courses. Each student will gain a thorough knowledge of biological processes that apply to him and grow to have an appreciation for the richness of the natural world around him. Students will learn to think like a biologist by making careful, quantitative observations, asking good questions, forming testable hypotheses, designing and executing laboratory procedures, gathering, analyzing, and presenting laboratory data, developing scientific arguments, and coming to reasonable conclusions. Principle topics may include cell biology, biochemistry, classical and modern genetics, molecular biology, evolution, and ecology. Emphasis will be placed on learning to make informed decisions about biological issues affecting the individual and the community.

### **Biology**

*Prerequisites: Successful completion of Third Form Physics and Chemistry or permission of the Science Chair.*

Biology focuses on building a solid and thorough foundation of fundamental biological principles through a project-based curriculum. A high value is placed on students engaging in challenging activities, collaborating with peers, and reflecting on their experiences, all of which support the acquisition of disciplinary knowledge. In this context, more opportunities for scaffolding the student experience and differentiating learning are possible. Students are assessed both formatively and summatively on classroom participation and content application and mastery.

### **Biology\***

*Prerequisites: Successful completion of Third Form Physics and Chemistry\* with the endorsement of the Chemistry instructor and permission of the Science Chair. Students who complete Chemistry and demonstrate a high likelihood of success in an honors level course may be recommended by their instructor with permission of the Science Chair.*

Biology\* is a challenging and fast-paced course that covers more breadth of content than Biology, approximating an introductory college biology course. Students must be able to engage independently with the material and should be comfortable using their textbook and other sources for the acquisition of knowledge. Students should execute laboratory exercises or projects confidently and independently and are expected to incorporate these experiences into their overall understanding without prompting. Students are frequently assessed in a summative way, covering multiple textbook chapters at once, and focusing on content application and mastery.

## ***Elective Courses***

Elective courses allow students to explore scientific topics that interest a student in more depth. All elective courses build on the foundations set in the core courses and students should expect to deepen their understandings, hone their scientific skills, and think critically about the intersections of science and other disciplines. Students will work individually and collaboratively as they experience a wide range of topics, teaching modalities, and assessment strategies. Enrollment in electives is prioritized for Sixth Form students; students in other forms may enroll if space is available and prerequisites have been met.

### **Full-year courses**

#### **Advanced Physics\***

*Prerequisites: Support of current math and science instructors and permission of the Science Department Chair are required for enrollment. **Student must be co-enrolled in Precalculus or higher.***

Advanced Physics\* is an intensive, year-long course that provides further exploration of topics from Third-Form physics while introducing a survey of additional topics common to a first-year college physics curriculum, including but not limited to kinematics, dynamics (Newton's Laws), gravitation, energy, momentum, oscillations, electricity, and/or magnetism. Materials will be presented at an accelerated pace with a strong focus on problem solving. Students will develop their understanding of physics through both mathematical analysis and laboratory inquiry. Students should expect frequent and challenging assignments as well as intense collaborative project-based experiences.

#### **Environmental Science\***

*Prerequisites: Successful completion of Chemistry with a B+ or better and successful completion of Biology with a B+ or better. The endorsement of science teacher and permission of the Science Chair.*

Environmental Science is an intensive, year-long course that engages with the scientific principles, concepts, and methods necessary to understand the complex relationship found within the natural world. In this interdisciplinary course, we will explore physics, chemistry, and biology topics learned in the core courses in more depth and qualitatively and quantitatively examine natural and human-made environmental problems. To do this best, we will introduce new material in topics such as atmospheric science, climate science, geography, geology, oceanography, zoology, and more. The course will have a laboratory component and, when possible, field work will be conducted on campus. Students should expect frequent and challenging assignments as well as intense collaborative project-based experiences.

## Term courses

### Advanced Topics in Chemistry

*Prerequisites: Successful completion of Chemistry\* or a final grade of B or better in Chemistry with endorsement of the Chemistry teacher and permission of the Science Chair.*

This second-year chemistry course will introduce fundamental concepts of organic chemistry, inorganic chemistry, physical chemistry, analytical chemistry, and/or biochemistry. Students can expect to explore topics in more depth than they experienced in the core Chemistry courses. Lab components of the course will introduce students to skills and techniques essential for experimentation in the field of chemistry. Emphasis will be placed on establishing connections to biology, material science, pharmacology, art, and other relevant applications. Understanding will be assessed with quizzes, tests, projects, and/or lab reports.

### Astronomy

*Prerequisites: Successful completion of Third Form Physics and Chemistry or Chemistry\* with endorsement of the current science teacher and permission of the Science Chair.*

The purpose of this course is to introduce the student to compelling aspects of astronomy that they may be less familiar with, namely to those areas of our universe that extend beyond our local solar system. We will investigate such areas as cosmology, galactic morphology, stellar evolution, dark matter and energy, evidence for intelligent life beyond our solar system, and the ultimate fate of the universe itself. We will be utilizing one of the more definitive classroom texts about astronomy, *Universe* by Freedman and Kaufmann. Our discussion will begin with a look at the origin and development of the universe and some of the largest-scale aspects of astronomy, effectively moving backwards through the book.

### Electronics\*

*Prerequisites: Final grade of B or better in Chemistry\* or final grade of A- or better in Chemistry. Endorsement of the current science teacher and permission of the Science Chair. **Student must be co-enrolled in Calculus or higher.***

This course provides an introduction to electricity and electronics with a focus on hands-on experience and practical applications. Electronics is one of the fastest expanding fields in research. From the invention of the transistor almost seventy years ago to our current reliance on the “Information Superhighway,” electronics has been a vital part of our modern technological society. The semester will begin with a look at the evolution of electronics over the last century. This will be followed by a thorough examination of the basic principles: voltage, current, resistance, Ohm's Law, Kirchoff's Law, etc. After a significant amount of time is spent on identifying and understanding how various electronic components work, students will design their own circuits. Using a solder gun and solderless breadboards, students will learn how to build analog circuits that accomplish particular tasks. Later in the semester, students will also have an opportunity to work with integrated circuits. Teamwork, critical thinking, and problem solving will be



important attributes. Assessment will be based on tests, homework, and frequent lab reports addressing our various circuit projects.

### **Global Impacts of Infectious Disease**

*Prerequisites: Successful completion of Biology with the endorsement of the Biology instructor and permission of the Science Chair.*

This course will examine the historical and contemporary impacts of infectious disease on our planet and its inhabitants. To demonstrate understanding, students will independently research and present proposals to minimize or eliminate the effects of a disease with global significance. Course and lab work will focus on the intersections of molecular and cellular biology, microbiology, immunology, physiology, ecology, epidemiology, and principles of public health. Students can expect to gain a breadth of knowledge in these areas; depth of study for each topic will be determined by needs for student projects and student interests.

### **Introduction to Engineering**

*Prerequisites: Successful completion of Third Form Physics and Chemistry or Chemistry\* with endorsement of the current science teacher and permission of the Science Chair.*

Engineering is a discipline that makes the modern world tick. Students will learn what engineering is and the types of projects engineers work on. They will explore the practical process philosophies that a good engineer must use. Through a series of real-world applications, they will investigate the complexities of the decisions faced by engineers and develop the thought processes that guide engineers through these problems. The students will complete team-based projects where they must deliver a product against a series of specifications, on-time, and to-cost. Projects, which may vary year by year, will be based around a definable goal. The projects are rooted in the real world and through them the students will benefit from not only the hands-on engineering experience but also the development of life skills that are the hallmarks of good engineers.

### **Molecular Biotechnology\***

*Prerequisite: Successful completion of Biology\* with a grade of B or better with the endorsement of the Biology instructor and permission of the Science Chair.*

This course is a synthesis of several disciplines: biochemistry, genetics, cell biology, and microbiology. Biologists have the means to analyze the Human Genome. The dissection of the molecular pathway through which hereditary information flows between DNA, RNA, and protein molecules adds to our understanding of human development and disease. Technological developments have provided powerful methods to isolate, analyze, and manipulate DNA, RNA and protein molecules. These developments have transformed biological and medical research. Time will be mostly spent in the lab, learning and using molecular and cell biology research techniques to sequence a gene. Biotechnology will be provided to students, so they can learn theory, practice, and applications with hands-on experimental

work. The curriculum may include applications of biotechnology such as genetic engineering, gene therapy, forensic science, and bioinformatics.

### **Policy and Ethics of Environmental Challenges**

*Prerequisites: Successful completion of Third Form Physics and Chemistry or Chemistry\* with endorsement of the current science teacher and permission of the Science Chair.*

As young adults, it is of paramount importance that Haverford students understand some of the most pressing environmental challenges that confront their generation in the new millennium. Essential global issues such as water scarcity, peak oil, climate change, and much more will be explored. Local issues in the state of Pennsylvania involving hydraulic fracking and environmental justice will also be discussed. We will take a holistic approach to confronting environmental challenges by not only discussing the scientific factors at play, but the social, moral, political, and economic factors as well. The course will be conducted like a discussion-driven graduate seminar where different points of view are encouraged. Course content will be borrowed from the University of Pennsylvania's graduate program in Environmental Studies. Students will be expected to read and interpret policy assessment reports and academic papers, constructively debate their peers, reach out to experts in the field, and collectively seek meaningful solutions.

## Physiology\*/Physiology

Physiology is a life science course that focuses on the normal functions and components of living organisms, including humans. Course themes focus on the mechanisms that sustain life and the ways in which these normal processes can be disrupted. Students may elect to take two semesters of the course if they are eligible in order to complete a full year of the material; either semester may also be taken independently.

### **Physiology\* - Communication and Recognition (fall)**

*Prerequisites: Completion of Biology\* with a grade of B or better with the endorsement of the Biology instructor and permission of the Science Chair. Students who complete Biology and demonstrate a high likelihood of success in an honors level course may be recommended by their instructor with permission of the Science Chair.*

Physiology\* - Communication and Recognition examines topics that include defenses against disease, transmission of information, regulation of body functions, and/or reproduction. Classroom learning takes advantage of laboratory exercises and dissections to provide opportunities to engage with the topics more deeply. Students must be able to engage independently with the material and should be comfortable using multiple sources of information for the acquisition of knowledge. Student understanding is assessed by tests, laboratories, projects, and a research paper.

### **Physiology - Structure and Transportation (spring)**

*Prerequisites: Successful completion of Biology with endorsement of the Biology instructor or permission of the Science Chair.*

Physiology - Structure and Transportation examines topics that include body structures, animal locomotion, internal transportation of materials and/or reproduction. Classroom learning takes advantage of laboratory exercises and dissections to provide opportunities to engage with the topics more deeply. Students should be comfortable using multiple sources of information for the acquisition of knowledge. Student understanding is assessed by tests, laboratories, and projects.

## Advanced Laboratory Research Cooperative

The Advanced Laboratory Research cooperative gives highly engaged science students the opportunity to experience research firsthand at regional research labs. During the summer of their Fifth Form year, students spend 6-8 weeks conducting research and learning advanced laboratory techniques while collecting and interpreting data. The program culminates with each boy presenting to peers, instructors, parents, and members of the lab teams with whom they worked.

### **Advanced Laboratory Research Cooperative I\* (spring – Fifth Form)**

*Prerequisites: Successful Completion of Chemistry\* and Biology\* with final grades of A- or better. Students will apply and be selected for this course by the Science Department during the fall semester of the Fifth Form year. Academic achievement, discipline record, attendance record, and input from past and current instructors will be considered during the application process. Formal invitations to enroll will be extended by the lead instructor and/or the Science Chair.*

Boys will learn about several scientific fields via exploration as well as reading and discussion of selected current scientific research. Once they have identified an area of interest, the boys will begin investigating opportunities for placement in a cooperating local university or private laboratory. Boys who complete this independent study portion of the course may be asked, based on their performance, to commit to enrolling in ALRC II\*. Following that invitation and commitment the boys will be enrolled in an eight to ten-week summer research experience in which they will work closely with researchers and/or graduate students at area universities or private laboratories on research projects they have selected. Upon successful completion of the summer research portion of the course, boys will receive retroactive credit for ALRC I\*. Students who receive credit for ALRC I\* must enroll in ALRC II\* in the Sixth Form

### **Advanced Laboratory Research Cooperative II\* (fall – Sixth Form)**

*Prerequisites: Successful completion of ALRC I\* and permission of the ALRC I\* instructor and the Science Chair.*

This is a one semester course for Sixth Form students who have completed ALRC I\*. If necessary, students continue to gather and analyze experimental data based on their summer research work. Time is then devoted to the organization, analysis, evaluation, and interpretation of their data. Concurrently the boys will discuss each other's data in a presentation/seminar format. The boys will then formally write up their research for possible submission to competitions or publications and begin preparations for presentation of their research experience to the Haverford School Community. If time permits, students will explore possible research extension questions based on their original work. During the spring semester they will occasionally be asked to advise and interact with Fifth Formers currently enrolled in ALRC I\*. Students will meet with the research advisor at least one long block each cycle. They will be expected to work independently between meetings. *This course will be scheduled in addition to the students' regular five class load.*

# INDEPENDENT STUDY

This is an opportunity primarily for Sixth Form students to pursue an academic interest in a tutorial setting. Independent study can further the academic and intellectual interest of both students and faculty, enrich the curriculum, and encourage interdepartmental courses and cooperation. **STUDENTS MAY NOT DROP AN HONORS COURSE OR A YEARLONG COURSE IN ORDER TO TAKE AN INDEPENDENT STUDY.** Be sure to include this in your planning for your academic course load. This course is available to students during the fall or spring semesters of the Sixth Form year or, in rare cases, the Fifth Form year. A student, in conjunction with the appropriate teacher, will develop his independent study proposal that is then forwarded to the Independent Study Committee. Please ask the Head of the Upper School or the Director of College Counseling about further details.

**Note: Independent Study is intended for work that is not available in the normal school curriculum.**

# INTERDISCIPLINARY STUDY

## Global Perspectives with Travel to Cuba (*spring – Fifth & Sixth Form*)

This four-unit course bridges interdisciplinary classroom learning with experiential and immersive travel, encouraging students to absorb and engage with new perspectives, foster independence and creativity, and inspire self-reflection. In the first unit, students will explore the foundations of citizenship in various societies, ancient and modern. The second unit will consist of projects relating to the United Nations' Sustainable Development Goals and will guide students to ponder the current state of our world through statistical models and scientific analysis. In the third unit of study, before the class' journey abroad to Cuba, the students will consider the country's current events, geopolitics, literature, culture and history through readings, class discussion and journaling. The course culminates with the opportunity for the student to delve into a significant research project of interest related to Cuba. The Director of Global Studies will lead the class and numerous faculty members will guest lecture on areas specific to their expertise. This semester elective includes travel to Cuba over Spring Break and it is strongly recommended that students who enroll in the course travel with the class. *There is an added cost to enroll in this course that will cover all travel expenses. That cost will be published when enrollment is finalized. See the Financial Assistance Policy for Global Studies Programs for more details. For the year 2022, the travel portion of this course will depend on the state of the Covid19 pandemic.*

# CO-CURRICULAR ACTIVITIES

## ***Athletics***

As a requirement for graduation, boys are expected to take part in athletics and activities. Boys in Third, Fourth, and Fifth Forms must participate in at least two seasons of approved interscholastic sports or activities. Boys in the Sixth Form must participate in one season of interscholastic sports or the equivalent activity.

The two-sport requirement will be fulfilled if a boy:

1. Joins two interscholastic sports teams in different seasons as a player or manager. Teams may be varsity or sub-varsity level
2. Joins one interscholastic sports team as a player or manager, and participates in one of the equivalent activities listed below.

Please note that most, but not all sports, have unlimited roster space.

### **Interscholastic Sports**

#### **Fall**

Cross-Country  
Football  
Soccer  
Water Polo  
Crew  
Golf

#### **Winter**

Basketball  
Ice Hockey  
Winter Track  
Squash  
Swimming & Diving  
Wrestling  
Crew

#### **Spring**

Baseball  
Crew  
Lacrosse  
Tennis  
Track & Field  
Ultimate Frisbee

### **Athletic Equivalent Activities**

Debate

Drama Production  
Glee Club

Jazz Ensemble  
Mock Trial  
Model UN

Notables

Orchestra  
Stage Crew

## ***Music and Theater***

### **Notables**

This is the premier vocal ensemble at The Haverford School. An auditioned vocal ensemble, students sing a variety of a cappella music from around the world. Students refine the proper use of their voice, enabling them to sing music of great complexity and vocal range. The Notables perform music in a variety of musical styles, with emphasis placed on historical and stylistic performance practice techniques. Students sing in balanced voice parts, and sing music with up to eight parts. They sing in a number of languages, and memorize a substantial repertoire for performance. Additionally, elements of stage deportment, ambassadorship, and community service comprise a substantial part of ensemble study. The students rehearse extensively, and perform at school and in the larger community. The Notables are committed to providing community service through artistic performance. They perform numerous concerts each year, with the majority performed at hospitals, nursing homes, senior centers and the like. The ensemble frequently produces recordings. Students are evaluated on their level of artistry, coachability, memorization skills, and adherence to performance practices of the various styles in which they sing.

### **The Haverford School Jazz Ensemble**

This ensemble performs a variety of contemporary, jazz-influenced arrangements for winds, brass, and percussion section. Students are auditioned and must demonstrate a satisfactory skill level to participate, as determined by the director. Students learn the skills of performing in an ensemble. They hone their technical skills and play in a variety of jazz styles. More advanced students apply their skills and knowledge to the art of improvisation. Performance venues include school functions as well as evening concerts in the winter and spring. Students must inform their advisor and the Jazz Ensemble Director of their intent for this activity to count towards their Arts graduation requirement.

### **The Haverford Advanced Chamber Ensembles**

These are auditioned ensembles for advanced instrumental players. Students refine their musical skills by studying and performing literature from the standard chamber music repertoire. They focus on playing soloistically within a small ensemble while matching bow strokes, articulations, tone colors and interpretations. The ensembles meet one morning per week and perform throughout the school year.

### **Glee Club**

Students learn the technical aspects of good singing, including breath control, formation of vowel shapes and vocal tone, proper diction in a variety of languages, range extension and agility. Students study repertoire from a variety of genres, from classical to folk to jazz and modern. They perform a cappella music as well as music accompanied by piano and orchestra. Through their rehearsal and performances, students learn a valuable skill that can be used as a form of self expression as well as a powerful form of communication. As the music is being rehearsed daily, various compositional techniques and elements of



form are pointed out. Glee Club members participate in service learning through outreach performances. This chorus performs at 4 major concerts each year, at Haverford, in New York City, and in our community. The Glee Club joins forces with area girls' schools and with Haverford's boy choir to perform works such as Vivaldi's Gloria, Handel's Messiah, and Haydn, Mozart and Schubert Masses. Glee Club is a graded course that meets three times a week before school, 8:00 a.m. - 8:30 a.m. on Monday, Tuesday, Thursday for tenors or Tuesday, Thursday, and Friday (for bass/baritones) with Wednesday being a make up day to allow for morning conflicts.

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### **Orchestra**

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Orchestra is an auditioned ensemble. Students must demonstrate satisfactory ability on their principal instrument to participate, as determined by the director. Students learn to phrase artistically, and develop techniques of articulation, expanded dynamic range, and stylistic interpretation through performance of a range of repertoire covering multiple styles and genres. Orchestra members develop ensemble skills such as leading, critical listening, and collaboration. In addition, students refine technical skills on their given instruments. The Orchestra performs during the annual Haverford School performances. Orchestra is a graded course that meets before school, 7:45-8:20 a. m. 3 times a week.

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### **Stage Crew**

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As a member of stage crew, students have the opportunity to participate in the active creation of theatre. Working both on school productions and with professional organizations, students have hands-on experience with carpentry, lighting technology, and with scenic painting. To fulfill one sports requirement through this activity, students must complete one semester of stage crew participation. To fulfill both sports requirements, students need to participate in stage crew for the school year. However, all Haverford students must participate in the athletic program at least once before graduation.

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### **Performance and Production Opportunities**

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Each year, The Haverford School Drama Department produces a minimum of two Upper School plays and/or musicals. By participating in theatrical productions either on the stage or back stage, students will become a vital part of a collaborative team. Students may count their participation in *one* of the upper school productions as *one* of their sports requirements. Students may not count participation in both productions as a fulfillment of their sports requirements for the school year.

## ***Clubs***

With more than 50 clubs and activities to choose from, our Upper School offers myriad opportunities for students to explore extracurricular activities and to develop leadership skills. All clubs are student-designed and student-led, with a faculty adviser who offers guidance and mentoring. Students and faculty are passionate about their interests – and they often extend their club commitments well beyond the boundaries of our schedule and campus.

All of our clubs and activities are active during the full School year. At the beginning of each academic year, students have the opportunity to join or start clubs based on their personal interests, and we enthusiastically encourage them to get involved. The list below is a representative, but not comprehensive, sampling of clubs and activities that have been offered in the Upper School over the past several years.

Clubs will be offered each year based on student interest.

## ***Service Learning***

The Upper School Student Service Board at Haverford is very active, with a wide variety of activities and opportunities. These events are student driven and student run and all students are invited to participate. Students who are not on the Service Board are welcome to present ideas for projects at each of our twice-monthly meetings. Some examples of service projects are as follows:

**City Year Servathon** is a day where volunteers renovate community centers in Philadelphia.

**Special Olympics** invites students to support special needs kids with a weekend of sport activities and “competitions” at this annual event held at Villanova each November.

**Riverbend Environmental Center’s Haunted Trails** is an annual opportunity for students to help one of our environmental partners stage a fun evening of ghoulish activities for children and nature lovers.

**Literacy Program** supports Bryn Mawr Tutoring and goes to West Philadelphia to tutor young people.

**Empty Bowls** is our year-long hunger awareness education program, culminating with the Empty Bowls supper in April, which raises funds for our local hunger partners and advocates for those challenged by hunger and homelessness.

**Helping Hunger Cooking Club** meets several times throughout the year to prepare meals for 200 homeless people at Life Centers of Delaware County and Ronald McDonald House. Together with Agnes Irwin, students cook and later serve these meals.

**Philadelphia Cares Day** is a day of service involving urban renewal in the Philadelphia schools.

**Environmental Work Days** Throughout the year we partner with local organizations to support and promote environmental projects including: clearing bike and walking trails, cleaning up streambeds, prepping playgrounds for physically disabled, helping plant and harvest at our local CSAs, etc. in Radnor, Haverford and Lower Merion

To raise awareness and funds, boys participate along with students from Agnes Irwin and Baldwin in various walks such as: **AIDS Walk Philly, Juvenile Diabetes Walk, American Heart Walk, Out of the Darkness Suicide Awareness Walk, The Buddy Walk** to support kids with Down Syndrome, **Walk to Cure MS**, and several others throughout the year.

In the spring, we participate in **Race for the Cure for Breast Cancer** and the **Home Run Baseball Derby** to raise funds for **Prostate Cancer Research**. Our Lacrosse team runs the annual **Checking for Cancer Tournament** to support male cancer research.

Students also have the opportunity to lead campaigns to support those in need such as Hunger Relief, the elderly, the homeless, and a variety of other crisis situations as they occur.

## ***Service Learning in the Classroom***

Whenever possible, we seek to integrate service opportunities into the classroom and curriculum to offer students real-life context to what it is they are learning. Examples might be: students in American History class will run a voter registration project for our own students; Ceramics students build bowls to be painted and sold at our Empty Bowls Supper; Engineering students design a water collection and irrigation system to help make the Learning Garden sustainable and environmentally responsible; Spanish classes tutoring immigrant workers in our region.

These efforts put their education and knowledge into action, and are offered to students throughout all divisions at The Haverford School.

## ***QUESTIONS***

If you have any questions about the contents of this Course Catalog, please contact:

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