

# **Greenhills School**

## **Course Guide**

**2018-2019**



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## ***Introduction***

Welcome to the Course Guide for the 2018-2019 school year. In this guide, you will find information on all courses that are being offered in the coming year. Students will receive separate instructions on the course selection process. Although this guide includes details related to academic matters, it does not include a full articulation of our school policies and procedures. You may access the Family Handbook for additional information on:

- Greenhills mission, philosophy, diversity statement, and core values
- Drop/add period and schedule changes
- Learning supports, accommodations, the Learning Center, and the counseling program
- Standardized testing accommodations
- Senior projects
- Final exam policies
- Study abroad
- Transfer credits from other institutions

## **I. ACADEMIC MATTERS**

### **Middle School**

Middle school students pursue a required course of instruction and make choices in foreign language, music, and extracurricular options.

### **Upper School Graduation Requirements**

Minimum General Requirements: A student must earn a minimum of 20 graduating credits in grades 9–12. All students in grades 9–12 are required to take a minimum of 5 courses which receive academic credit each semester.

### **Minimum Departmental Requirements**

#### English

4 Credits: English I, II, III required. Students must select a course both semesters during senior year.

#### History and Social Science

3 Credits: at least one credit in World History (Foundations of Civilization **or** Modern World), one credit in United States History, and/or one credit from electives. **Note:** If both World History courses are taken, the second credit in World History can fulfill the additional elective requirement.

#### Mathematics

3 Credits: through at least Algebra II.

### Science

3 Credits: at least one in life science and one in physical science (Chemistry or Physics); we strongly encourage students to take at least one course in all three areas, Biology, Chemistry and Physics.

### Modern and Classical Languages

2 Credits: two sequential levels studied at Greenhills School, though three years of study is strongly recommended. When possible, we recommend the entire sequence of study.

### Fine and Performing Arts

1 Credit

### Health and Wellness

1 Credit

Students are required to take the one-semester health course and the one-semester lifetime fitness course.

### Service Learning

Greenhills students will complete at least one service learning experience every calendar year in the upper school. Service projects must include a participation minimum of three times or ten hours. Students will log hours and submit a reflection using the x2VOL online program for each project.

In addition to the above requirements, upper school students have the opportunity to take electives, be involved in co-curricular activities, as well as in clubs and sports.

## **Course Selection**

In the spring of each year, students receive a registration form for the upcoming year. The online course guide provides descriptions of courses, a summary of requirements, an explanation of credits, policy for placement and advancement in sequential courses, and a tentative educational plan. Students select their courses taking into account minimum departmental requirements, graduation requirements, and personal interests. In certain cases, departmental or teacher approval is required.

## **Course Placement**

Every attempt is made to place students in courses at the appropriate level of challenge. Occasionally, the need arises for a student to make a placement adjustment (for example, from Honors Geometry to regular Geometry). In this case, students may change placements at any time within the first marking period with no record on the transcript. Marking Period I grades will be calculated in consultation with the teacher and the Department Chair. If a student wishes to change placements after the first marking period, substantial justification and approval are required for the change, and “withdrew passing” or “withdrew failing” is recorded on the transcript.

### **Failing a Course/Repeating a Failed Course**

If a student fails an upper school course, the grade of "E" is indicated on the transcript and is figured as "zero" when calculating the grade point average. Regarding the minimal 20 credit graduation requirement, no credit is given for a failed course. Sometimes a department may require or recommend that a student repeat a failed course, or a student may simply elect to do so. In such cases the earlier course and grade remain on all school records, and the repeated course and grade are indicated as well. If the repeated course is passed, then the student receives credit for it towards graduation requirements.

### **Repeating Courses**

There are certain courses at Greenhills that students may repeat and for which credit can be earned each time. These include art courses, and choral and instrumental music classes. If a student wishes to repeat some other course and receive credit for it, approval must be granted by the teacher, and priority will be given to students wishing to take it for the first time if the course enrollment is full.

### **Advanced Placement Examination Program (Upper School)**

The Advanced Placement Program is a cooperative educational endeavor between secondary schools and colleges and universities. It provides the means for colleges to grant credit, placement, or both to students who have applied themselves successfully. Students may elect to take Advanced Placement examinations when they are offered in May. Students will be notified well in advance of the procedures for taking Advanced Placement examinations. Generally speaking, students who take a designated AP course are expected to sit for the exam. For seniors, students are expected to attend the entire AP course, including after senior release. Check the Online Course Selection Guide for course designations, descriptions, prerequisites and other AP requirements.

### **Special Arrangements for Independent Study**

Independent study courses may be approved for seniors who have exhausted a sequence in our curriculum and have met the school's graduation requirements in that area. An independent study class will not replace or count as a course required for graduation, nor will it count toward meeting the five-course minimum required each semester. A student wishing to receive Greenhills credit for an independent study arrangement (whether taught by a Greenhills teacher or one outside) must tender a comprehensive written proposal to the Head of Upper School and appropriate Department Chair, including instructor's name and qualifications, address and phone number, specific time arrangements (equivalent to in-class and homework time for a regular course), requested credit, and parent signature. All such arrangements must be approved in advance and before the start of the semester. All independent study classes will be graded on a Pass/Fail scale. The teacher sponsoring the independent study class must be a member of the department through which the course relates. For example, a course for which a student is seeking Science credit will have a Science teacher as an instructor. If a teacher from another department is sponsoring the class, agreement for this must be reached

between Department Chairs from the respective departments prior to the beginning of the class.

Of special note are classes related to foreign languages not offered by Greenhills. We support and admire students who wish to pursue the acquisition of all languages. When a student chooses to learn another language outside of our program this will not replace our graduation requirements. These courses will not be listed on the Greenhills transcript.

### **Courses Taken at Other Institutions (Upper School)**

Students may take courses at other institutions if they are not offered by Greenhills and providing they receive prior approval from the Head of Upper School. These courses will not appear on the official transcript and are not included in the student's course load. They may not be used to fulfill graduation requirements stipulated by individual departments. Once graduation requirements are met, seniors may take a maximum of one independent study class per semester. These courses will be documented on the transcript as pass/fail only. Juniors who have also met graduation requirements may obtain special permission to take an independent study class each semester. Permission from the appropriate Department Chair and Head of Upper School will be required. Documentation will be required for students seeking to pursue independent study.

## **II. Courses Offerings for 2018-2019**

**Please note:** *All full year courses are worth one credit and single semester courses are worth ½ credit, unless indicated otherwise.*

### ***Co-curricular***

#### **Forensics**

Forensics offers students the opportunity to develop public speaking skills. Participants write speeches, learn impromptu, extemporaneous or broadcasting techniques, or work with selected pieces of literature in preparation for competition.

Grades: 9-12                      Credit: 0                      Term: All Year

#### **Literary Magazine**

*Evergreen* is the student-produced literary magazine. All Greenhills students have the opportunity to submit written works for this annual publication.

Grades: 9-12                      Credit: 0                      Term: All Year

## **Newspaper**

*The Alcove* is the student-produced newspaper. Published bi-monthly, students participating in its production have an opportunity to take photos, write text and work on the layout of the publication.

Grades: 9-12

Credit: 0

Term: All Year

## **Yearbook**

*Forward* is the student-produced all-school yearbook. Students participating in its production have an opportunity to take photos, write text and work on the layout of the publication.

Grades: 9-12

Credit: 0

Term: All Year

**Note:** these courses are acknowledged on the transcript with a designation of honors, satisfactory, or unsatisfactory. No academic credit is awarded for these courses.

# *English*

## **English Department Philosophy**

The English department at Greenhills believes that literature presents opportunities for joy and reflection. Since the power of language is central to everyday life, we strive to foster passion for words, ideas, and self-expression in every student. Reading and writing allow us to grapple with multiple perspectives and challenge us to think in new ways about ourselves and the world. We encourage the deep analysis of literature, language, and the human experience in order to prepare students to choose lives full of meaning and compassion. The study of literature is a key component in the development of critical thinkers, empathetic individuals, and responsible citizens who have the power to effect change in the world through a strong and active relationship with language.

English classes at Greenhills:

- provide an intellectually immersive experience
- function as a community of readers and writers
- employ close reading as a form of inquiry
- conceptualize reading, writing, and thinking as recursive processes
- build on prior skills while pushing students to break new ground
- explore philosophical questions, synthesize information, and embrace complexity
- create critical thinkers, astute listeners, and inspiring communicators

## **MIDDLE SCHOOL**

### **English 6**

In this course, students read, analyze, and discuss short stories, poems, plays, novels, and essays. Professional works serve as model texts that help students enhance their critical reading skills and gather more confidence in their writing. In writing workshop, students draft creative and expository pieces. While discussing class texts, students examine genre, style, emotional themes, and societal issues. Throughout the year, students begin to grapple with the differences between writing for the page and writing for oral performance. The class uses *Rules of the Game: Grammar Through Discovery* as a jumping off point for grammar lessons, which focus on spelling, usage, mechanics, parts of speech, and word order. Vocabulary is taught within the context of literary texts.

Core texts for English 6 include: *The Mostly True Adventures of Homer P. Figg* by Rodman Philbrick, poems in *A Child's Anthology of Poetry* edited by Elizabeth Hauge Sword, *The Mousetrap and Other Plays* by Agatha Christie, and *Boy* by Roald Dahl. *The Westing Game* by Ellen Raskin is read over the summer before entering 6th grade and is discussed at the beginning of the year. Students also read short stories from *America Street* edited by Anne Mazer and written by Nicholasa Mohr, Langston Hughes, Robert Cormier, and others. The book list may change from year to year.

Term: All Year

## **English 7**

English 7 focuses on skill development in reading, writing, and speaking. Exploring a variety of forms and genres, students consider writing as an intentional act that can be examined, questioned, and discussed. Students develop concrete strategies to enhance reading comprehension and consider texts at an abstract level through analysis of character, relationship, and theme. Written work stresses the use of evidence and reasoning to support one's claims. Grammar instruction is incorporated throughout the year and places particular emphasis on sentence variety and avoidance of common mechanical errors. In the Integrated Public Speaking program (IPS), students review basic vocal delivery skills — eye contact, articulation, projection, inflection, and pause — while enhancing presentations through the use of gesture and movement. Particular emphasis is placed on the learning process, and students are given specific steps and tasks to help them read closely, write purposefully, and speak effectively.

Core texts for English 7 include: R.J. Palacio's *Wonder*, S.E. Hinton's *The Outsiders*, William Shakespeare's *A Midsummer Night's Dream*, and Karen Hesse's *Witness*. In addition, the RIC ("Reading is Cool") program builds a culture of readers by asking students to read and respond to literature independently throughout the year. The book list may change from year to year.

Term: All Year

## **English 8**

The English 8 curriculum builds upon the practices of textual analysis, writing in varied registers, and public speaking, each of which was introduced in English 7 and English 6. In this course, students use texts to explore increasingly sophisticated notions of what it means to transition from adolescence into adulthood. Students are introduced to the concept of subtext, and emphasis is placed on analyzing characters through motivation and action. Students are asked to make connections between the fiction they read and their own life experiences. They are also encouraged, through a yearlong portfolio project, to recognize and reflect upon their reading and writing practices. Through the Integrated Public Speaking program (IPS), students present a memorized scene from Shakespeare's *Romeo and Juliet* and an oral reading of one of the selections from their portfolio project. Fundamental vocal and physical delivery skills are reinforced, while advanced skills, such as vocal variety, pacing, creation of character, and creative use of space, are introduced. Students also write and deliver a persuasive speech on a topic of their choice. Attentive audience behavior is expected with the use of written and oral positive feedback and constructive criticism. There are several grammar, usage, and punctuation units throughout the year that equip students with the tools needed to work toward clarity and grace in their speech and writing.

Core texts for English 8 include: William Shakespeare's *Romeo and Juliet* and Harper Lee's *To Kill A Mockingbird*. The book list may change from year to year.

Term: All Year

## UPPER SCHOOL

Students must take four full years of English in order to fulfill the graduation requirement.

### **English I: Global Identities**

This course introduces students to important works of world literature, both ancient and modern, within the framework of focused discussions of literary terms and techniques. The literature is pulled from a global selection of novels, graphic novels, short stories, poems, and movies. As students review and discuss the texts, they examine several aspects of the coming of age theme and issues of identity, alienation, and community. English I is designed to solidify the skills of close reading and literary analysis before having students compose longer argumentative essays. The first several months of the academic year are spent developing more sophisticated close reading skills and working on the building blocks of analytical writing; in the spring, the course shifts into a thorough consideration of writing, revision, and argumentation in various forms, including the traditional academic essay. In order to improve the quality of all written work, and to develop the skill of metacognition, students are also assessed on their ability to write reflectively about their growth as writers. Grammar is taught in the context of broader writing goals; emphasis is placed on practice and active engagement rather than on the memorization of rules. Vocabulary is taught in context and through lessons on the common Greek and Latin roots that make up many words in the English language. Moreover, a public speaking requirement pushes students to improve their oral communication skills. Through the Integrated Public Speaking program (IPS), students present an informative speech, an oration, and a memorized scene from *The Tempest*. Basic and advanced vocal and delivery skills are reinforced with an emphasis on the varied purpose of speeches, the use of humor in a presentation, and an understanding of the communication process which includes positive feedback, constructive criticism, and listening skills.

Core texts for English I include: Homer's *The Odyssey*, William Shakespeare's *The Tempest*, Marjane Satrapi's graphic novel *Persepolis*, and/or similar works. Students also read widely from a diverse collection of short stories and poems. Quality films such as Niki Caro's *Whale Rider* and the Coen brothers' adaptation of *The Odyssey*, *O Brother, Where Art Thou?*, enhance students' knowledge and understanding of themes and ideas from across the world. The book list may change from year to year.

Grade: 9

Term: All Year

### **English II: British Literature**

The course of English study for sophomores focuses on the literary traditions of Britain and their extension to, and reflection within, the colonial and postcolonial worlds. This study is not intended to be a full historical survey but rather a representative journey that touches upon major historical, thematic, and formal developments in the language, literature, and culture of our nearest parent culture. The landmarks that define our course

of study trace the enduring relevance of the English literary tradition, which includes such authors as Chaucer, Shakespeare, Raleigh, Sidney, Herbert, Donne, Milton, Blake, Coleridge, Keats, Shelley, Wordsworth, and Dickens. Throughout the year, special attention is paid to themes recurring across eras and genres throughout the canon of British literature. Students practice close reading and critical analysis through classroom discussions as well as in creative and analytical writing. The reading and writing elements of the course also build upon grammar skills and rhetorical strategies learned in previous years.

Grade: 10

Term: All Year

Prerequisite: English I

### **English II Honors: British Literature**

The advanced course of English study for sophomores focuses on the formulation of literary traditions in Britain — how they present, and re-present the self at critical historical moments. We will proceed by examining the circulation of power through a variety of hierarchies that rework the dynamic between authority and subjectivity: Self/Other, English/Native, White/Black, Man/Woman, Normative/Transgressive. We will explore how the historical moment provides a context for the relevance and construction of these hierarchies. Where the regular English II course relies on representative texts across the tradition, the Honors course will concentrate more fully on texts drawn from major historical periods. Chaucer, Shakespeare, Queen Elizabeth, Donne, Milton, Aphra Behn, Wordsworth, Mary Shelley, Yeats, Kipling, Orwell, Gordimer, Walcott, Jamaica Kincaid and Rushdie. Whereas a significant proportion of the regular English II course is dedicated to basic learning skills, study skills, and writing skills, the Honors course presupposes sufficient learning, study and writing skills to allow the class to prioritize literary, historical and theoretical study. Our intellectual energies would be focused on the skills of close reading, critical analysis, keen commentary and the development of incisive critical prose as well as an authentic narrative voice. Writing assessments would be both creative and analytical, more complex and more sustained in terms of scope.

Grade: 10  
approval

Term: All Year

Prerequisite: English I, department

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

The purpose of this course is to provide students with a broad and firm base in writing and discussion skills that allows them to be confident, thorough, and effective in expressing their ideas. Students read thematically in a variety of genres, ranging from poetry to nonfiction to several challenging and substantive novels drawn from the American literary canon. Emphasis in class discussion and in writing assignments is on the analysis of literature both as an exploration of complex ideas and as an art. Students are asked to engage in close textual analysis as they respond meaningfully to the ideas authors present as well as to the literary devices they employ. Writing, both expository and creative, is a primary focus in the class, and artistic and/or film-making projects may also be incorporated. Written assessments are designed to encourage students to think of

writing as a multi-step process and to aid students in the development of an authentic writing voice. In the eleventh grade year, students also complete a research paper with the broader objectives of learning to navigate online databases; understanding the relationship between primary and secondary sources; and honing their use of rhetorical skills in argumentation.

Grade: 11  
Honors

Term: All Year

Prerequisite: English II or English II

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

The AP version of this course adds a special focus on the composition models and techniques that are stressed on the Advanced Placement exam in Language and Composition. Students study essay samples drawn from this test and from other sources, write essays modeled after them, and analyze the prose techniques that writers use. Students in the AP course are encouraged to take the AP Language and Composition exam and will be familiar with the nature of the test if they choose to do so.

Grade: 11

Term: All Year

Prerequisite: English II or English II Honors, department approval

### **ELECTIVES**

Students are required to take one elective each semester of their senior year to meet the required full year of credit for English in the senior year. The seminar format of intensive study on a special topic serves as the capstone to students' previous work in upper school English courses.

We will make an effort to place seniors in one of their top three choices; however, it is possible that not all electives will run. In that case, placement will be shaped by the student's schedule, the optimal class size for electives, and other relevant factors.

### **Journalism**

Ever wonder why some of our nation's best known heroes work in the news industry? You know, Clark Kent, reporter for the Daily Planet? And what about Peter Parker, freelance photographer at the Daily Bugle? Thomas Jefferson stated that "our liberty cannot be guarded but by the freedom of the press, nor that be limited without danger of losing it." The press, also referred to as "the fourth estate" (or the fourth branch of government), shoulders a great civic burden, one which all citizens, journalists or otherwise, must uphold. The comic book heroes might add glamour to the life of a journalist, but the heroic potential should not be mistaken as hyperbole.

This course will provide students with a conceptual and practical introduction to journalism. Students will study topics such as ethics and law, writing and reporting, information literacy, photojournalism, the history of journalism, and the relationship between free press and democracy. In addition to critically examining news media, students will read texts about journalism and publication as well as study a full-length

work of literary nonfiction in the genre of investigative journalism. The primary mode of assessment will be through the students' effective maintenance of *The Alcove*, Greenhills' student newspaper. Students will be responsible for researching, writing, revising, editing, and publishing routine contributions for *The Alcove*. While this course will not make writing for *The Alcove* exclusive, students with serious interest in working on *The Alcove* are strongly encouraged to enroll. Journalism can count toward the general elective requirement.

Grade: 9-12

Term: Semester I, Semester II

Prerequisite: None

#### **English IV: African American Literature**

What is African American Literature? How does racial identity shape the practice of writing? Conversely, how does writing construct racial identity? How do African American authors respond to the historical, cultural, and social contexts that fashion their imaginations? This course will take up these questions and others in order to enable students to explore the relationship between identity and self-expression more broadly. Coursework will include a class blog, an etymology project, a presentation focused on a single author, and a midterm focused on synthesis, reflection, and creativity. Texts for the course may include *Their Eyes Were Watching God* by Zora Neale Hurston, *Kindred* by Octavia Butler, *Song of Solomon* by Toni Morrison, and *Between the World and Me* by Ta-nehisi Coates, as well as poetry and music.

Grade: 12

Term: Semester I

Prerequisite: English III (or English III AP)

#### **English IV: Creative Writing Workshop**

In this course, students produce various forms of writing, including fiction, personal essays, and poems. Students frequently write in class and share their work with peers. Longer writing exercises are discussed systematically and critiqued constructively; the goal is to engage, support, and guide writers to become better at their craft. Students who enroll in the course do not have to be exceptionally strong writers, but they must be highly motivated. The class should be considered a personal, artistic exploration through which students choose to commit themselves to intellectual risk-taking and to the considerate discussion of others' work. In addition to writing and workshopping, students read essays, short fiction, and poetry, not as subjects of analysis, but as models for study. By the end of the course, students will have extensive experience generating content ideas, expanding upon them, and, finally, revising their work.

Grade: 12

Term: Semester I

Prerequisite: English III (or English III AP)

#### **English IV/Fine Arts: Playwriting**

This creative writing course gives students first-hand experience with the distinct qualities of writing for the stage. Students consider these vital questions: what elements distinguish playwriting from other forms of writing? How does one fashion ideas into dramatic dialogue and action? Students in this class explore the process of writing plays

by reading one-act as well as full-length plays while working on their own pieces. Each student completes a ten-minute play and a larger one-act play. Daily classes consist of writing exercises and free-writes, discussion of reading, the sharing of each other's plays and assignments (read by classmates), as well as engagement in the final project. This course may be used to satisfy one semester of the Senior English requirement or a Fine Arts credit, but not both.

Grade: 12

Term: Semester I

Prerequisite: English III (or English III AP)

#### **English IV: Shakespeare on Love**

"Love is," according to French theorist Julia Kristeva, "the time in which the Subject assumes the right to be extraordinary." Four centuries earlier, Shakespeare dramatized this idea, imagining more ways than anyone before him that the subject may be "extraordinary" in love. The course of study for this class is dedicated to understanding "love" as Shakespeare does, which is to say, as a malady, a cure, madness, salvation, sacrifice, trust and betrayal, self-immolation and self-projection. Students consider love as a philosophical concept and a social (and political) expression of subjectivity or the concept of Self. Critical work combines a rigorous examination of selected plays and sonnets from the literary, historical, theoretical (New Historicism/Cultural Materialism), and performance perspectives. This class also addresses the pesky authorship question, considers issues surrounding text editing, and considers production choices proffered by various directors of the same play. Texts include a number of the following: *Romeo and Juliet*, *Love's Labor's Lost*, *A Midsummer Night's Dream*, *Much Ado About Nothing*, *Antony and Cleopatra*, *Twelfth Night*. Student work will include a philosophical exploration on love, student performances, performance reviews, a seminar paper, and a final formal academic essay.

Grade: 12

Term: Semester I

Prerequisite: English III (or English III AP)

#### **English IV: Space Oddities: Science Fiction and the Future**

Stories of science fiction have fascinated the imagination since their nascence. Some scholars trace their origins back nearly five centuries to legends about the Man in the Moon; others point to Mary Shelley's *Frankenstein* as the Promethean text. No consensus on this point is needed, however, to recognize that the 20th century witnessed science fiction emerge from the obscure corners of pulp fiction and evolve into a critically accepted and respected form of literature. In this course, we will explore worlds imagined and, in some cases, forecasted. We will look at science fiction's relevance to the human condition, its uncanny ability to prophesize the future, and its depiction of events we would rather avoid. The course will be structured thematically to introduce students to myriad authors and sub-genres, expanding each student's personal science fiction megatext. We will read texts from authors such as Ursula K. Le Guin, Margaret Atwood, H.G. Wells, Kurt Vonnegut, Cormac McCarthy, Octavia Butler, William Gibson, Philip K. Dick, Ted Chiang, Isaac Asimov, and Ray Bradbury. Students will engage the academic discourse through discussing and writing on topics such as what makes for

“good” science fiction,” what science fiction says about contemporary society, and how and when science fiction offers a better literary template than realistic fiction.

Grade: 12                      Term: Semester I                      Prerequisite: English III (or English III AP)

**English IV: What is Hip?**

"What is Hip?": A Square Study of a Cool Concept. San Francisco super band Tower of Power put this funky question to America back in the 1960's and in so doing asked a critically important question for any deep understanding of American culture. If Hip can be said to have come from some place, that place would be the often contentious, ever creative relationship between the White and Black experiences and expressions of American life. This course focuses on the history of Hip, using John Leland's outstanding book as a foundation, and considers individual expressions of Hip in music (Muddy Waters, Sun House, Jerry Lee Lewis, Chet Baker, Elvis Presley, Miles Davis, Eminem), in literature (including but not limited to Mark Twain, Jack Kerouac, Norman Mailer, Amiri Baraka, Ishmael Reed, William Gibson—can a Canadian be Hip?), in film (Dennis Hopper, Quentin Tarantino), and in spoken word (Lord Buckley, Lenny Bruce, Richard Pryor, Dave Chappelle). Students will consider how the cultural feedback loop of white and black experience informs trends, economics and social groupings in the work of Malcolm Gladwell, Thomas Frank and Murray Milner, Jr. Student work consists of seminar papers on individual Hip performances, a Voicethread presentation for a Hip Encyclopedia, an entry to a “What Green People Like” wiki, and a final research paper.

Grade: 12                      Term: Semester I                      Prerequisite: English III (or English III AP)

**English IV/Fine Arts: Acting Shakespeare**

This course delves deeply into one Shakespeare play and culminates in a production at the end of the semester. The class aims to capture both the poetic and the dramatic essence of the language, and students explore the text physically as well as through discussion. Before staging of the piece begins, students engage in many exercises and games that allow the text to inhabit the body. Final performances are held in the theater. Students are expected not only to act but also to be involved in other aspects of the production, from set construction and costuming to promotion and fundraising. This course may be used to satisfy one semester of the Senior English requirement or a Fine Arts credit, but not both.

Grade: 12                      Term: Semester II                      Prerequisite: English III (or English III AP)

**English IV: Ethics and/in Literature: Good and Evil, Right and Wrong, and the Human Soul**

The powers of reflection, self-determination, independent assessment and willful revision have historically comprised the Human Soul. “Oh speak no more,” Gertrude implores her son Hamlet, “Thou turnst my eyes into my very soul.” Her pain emanates from the shame

of wrong and evil choices which she would prefer to ignore. The call to reflect forces a moment of assessment and the determination that she is found wanting; that reflection, the assessment and the final determination are all supposed to have taken place in the soul. With the advent of the Enlightenment the concept of the Human Soul, and its work, were challenged at their most essential level. This course intends to make a case for the viability and value of the Human Soul as an arbiter of ethical choices and the progenitor of Good in a world consumed with Evil. The evidence for this case will be discovered in literature, that discourse which most readily invites ethical inspection and moral evaluation. Consequently, the intellectual work of this course will be twofold: first, an introduction to ethical systems and their applications, and second, the relationship of ethics to literature, which is to say, to formal and thematic choices by authors as well as case studies of choices made by characters. Our reading will include introductions to ancient and modern ethical systems in John Deigh's *An Introduction to Ethics*, Martha Nussbaum's book *Love and Knowledge*, Philip Zimbardo's book *The Lucifer Effect*, John Milton's *Paradise Lost*, William Styron's *Sophie's Choice*, Charles Fuller's *A Soldier's Play*, as well as various other short stories. The work will include careful reading, engaged and active discussion, potted lectures, digital presentations, critical essays, and ethical case work.

Grade: 12                      Term: Semester II      Prerequisite: English III (or English III AP)

#### **English IV: Race & Gender in Contemporary Life and Literature**

How are race, gender, and other categories of identity constituted? What is the relationship between social construction and subjectivity? How are systems of human inequity structured by claims about individual bodies and collective character? This seminar uses the theory of intersectionality as a framework for exploring both institutional and individual relationships between oppression and privilege. Students work to create understandings of the complexity of identity and of systems of oppression through detailed readings and intensive discussions that involve intellectual risk-taking. Students will develop their ability to critique social institutions as well as their capacity for empathy on an interpersonal level. In addition, they will leave the class equipped with a stronger vocabulary for discussing the complicated realities of our modern world. The course is guided by the principles of feminist pedagogy, which invites the sharing of personal experience as a valid and necessary form of learning for all members of the class. Assessments include a class blog, a personal essay, group projects, and an exam focused on synthesis and reflection.

Grade: 12                      Term: Semester II      Prerequisite: English III (or English III AP)

#### **English IV: Revision Workshop**

Whereas Creative Writing Workshop focuses on the generation of fiction, poetry, and personal essays, this workshop focusing on taking work to "the woodshed" (i.e., polishing, re-crafting, restructuring work). Students will write first drafts, but rather than move onto the next piece, they will spend significant time gathering feedback from

students and the instructor to strengthen each piece. At the same time, the course will be highly collaborative, with students determining how and what they will write, and how they will work together to make the writing successful. Some short reading will be included as well to provide inspiration and encourage reflection. The students will emerge with a substantial finished product, the nature of which will be determined by the group. Priority will be given to students who have completed Creative Writing Workshop.

Grade: 12                      Term: Semester II      Prerequisite: English III (or English III AP)

**English IV: Surviving America: The Dream and the Struggle**

The American Dream is integral to the philosophical fabric of our nation. In this course, we will examine this premise, its origins, its byproducts, and its barriers. Using binary opposite thematic pairings (ex: oppression and justice) characteristic of Western thought, we will critically examine American texts that provide various perspectives across time, place, race, socio-economics, and other variables that can stratify humans, specifically in our experience as Americans. Students will engage the academic discourse through discussing and writing on topics such as repression, self-reliance, resilience, success, and purpose as they pertain to what it means to be American as well as our relationship to the American Dream. We will read texts from authors such as Alan Moore, Kate Chopin, Moises Kaufman, Jhumpa Lahiri, Jonathan Safran Foer, Toni Morrison, and John Steinbeck. We will also examine selections of American art, music, and film to enrich and expand the dialogue.

Grade: 12                      Term: Semester II      Prerequisite: English III (or English III AP)

**English IV: [t]ex[t]position, or Reading Theoretically**

[t]ex[t]pos is dedicated to the work of writing about reading, where "reading" is a multivalent act involving a series of presumptions about the act itself. The job of work is to explore the notion of the "sign" as defined by Ferdinand Saussure, considering how the sign operates or fails to operate with respect to such topics as culture, power, self, gender, and race. Students read the work of philosophers and critical thinkers like Plato, R. P. Blackmur, Cleanth Brooks, Marx, Althusser, Roland Barthes, Jacques Derrida, Michel Foucault, Luce Irigaray, Carol Gilligan, Houston Baker, Jr., Henry Louis Gates, Jr, and Joyce A. Joyce, taking as texts everything around them that attempts to signify: our "literature," our school, our culture, our selves. The course concludes by considering Huston Smith's essay "Beyond Postmodernism" in relation to Antoine de Saint Exupery's classic tale *The Little Prince*. Class work will include quizzes, and three academic essays.

Grade: 12                      Term: Semester II      Prerequisite: English III (or English III AP)



## ***Fine and Performing Arts***

Arts education is essential for every student. The faculty of the Department of Fine and Performing Arts at Greenhills believe that our mission is to promote creative expression, communication skills, problem solving, and inventive thinking. Courses are designed to foster lifelong appreciation through active participation in a variety of arts activities. It is through personal discovery and experimentation, coupled with consistent involvement in the arts that skills are developed, appreciations are formed, and creativity is encouraged.

### **MIDDLE SCHOOL - 6<sup>th</sup> grade**

The Fine and Performing Arts include the following areas of study: Visual Art; Speech and Drama; and Music. Students partake in all of these offerings throughout the year. Several two-week Visual Arts courses introduce students to a whole realm of media. Speech and Drama is conducted once per week. Music is divided between the options of Wind Orchestra (including percussion), String Orchestra, and Choir. Students must choose between the three music offerings. Students do not need prior experience to play in the 6th grade Winds or Choir; however, it is recommended that students have some experience to play in the 6th grade strings.

Grade: 6                      Term: 2-3 Days/Week All Year

### **MIDDLE SCHOOL - 7<sup>th</sup> & 8<sup>th</sup> grade**

#### **Art**

This course helps students explore various aspects of the visual arts. This one-semester class will put an emphasis on the development of meaning making through art. Students will explore: art history, art criticism, aesthetics, social issues commonly addressed in artworks, the art of other cultures, visual culture, and various art production techniques. Students will have the opportunity to explore their creative ideas through the art production process. Art production areas can include: drawing, painting, fiber arts, metal arts (jewelry), sculpture, and ceramics (potter's wheel and hand-building processes). The goal will be for students to gain an understanding and appreciation of the visual arts. Student work will be displayed regularly in the school. In addition, students will have opportunities to work collaboratively on art projects.

Grades: 7–8                      Term: 2-3 Days/Week for one semester

#### **7th grade Wind Orchestra**

The Wind Orchestra is a performing group comprised of 7th grade musicians with previous experience on a wind or percussion instrument. Playing different genres of music, the Wind Orchestra performs in concert at the end of each semester. This group performs both alone and in combination with the 7th grade String Orchestra to form a full orchestra. Grades reflect daily preparation and conduct, concert participation and completion of periodic assignments.

Grade: 7                      Term: 2-3 Days/Week for one semester

### **Jazz 8**

Jazz 8 is a performing group comprised of musicians with previous experience on a wind, string or rhythm section instrument (guitar, bass, keyboard, drum set). Jazz 8 is open to all continuing music students interested in practicing and developing the technique and interpretive skills fundamental to performance in the jazz/rock idiom. Improvisation is introduced as a new concept along with various components of music theory, composition and history. Playing different genres of improvised music, the band performs in concert at the end of each semester. Grades reflect daily preparation and conduct, concert participation and completion of periodic assignment.

Grade: 8                      Term: 2-3 Days/Week for one semester

### **Drama Workshop**

Courses offered in the dramatic arts expose students to techniques in improvisational theater, characterization, and presentation through the study and execution of theatre games, script adaptation, vocal inflection, mime, and dramatic characterization. Middle school students have the opportunity to audition for and participate in the annual play and in the forensics program.

Grades: 7–8                      Term: 3 Days/Week for one semester

### **Choir**

This choir is an ensemble that helps build musicianship skills through the discovery and performance of rich, exciting choral literature. Mixed with preparation for concerts are activities centered around music appreciation, music theory and movement. The music studied spans many styles, from Renaissance madrigals to contemporary Broadway, and two main concerts are given each year, with other events freckled around the calendar. There are also opportunities for students to participate in outside school activities through the Michigan School Vocal Music Association (MSVMA), such as Honors Choir, Solo/Ensemble, and Choral Festival.

Grades: 7–8                      Term: 2-3 Days/Week All Year

### **7th grade String Orchestra**

The 7th grade String Orchestra is a performing group comprised of 7th grade musicians with previous experience on a string instrument. Playing different genres of music, the 7th grade String Orchestra performs in concert at the end of each semester. This group performs both alone and in combination with the 7th grade Wind Orchestra to form a full orchestra. Grades reflect daily preparation and conduct, concert participation and completion of periodic assignments.

Grade: 7                      Term: 2-3 Days/Week all year.

### **8th grade String Orchestra**

8th grade Orchestra is a performing group made up of 8th grade students with previous experience on any orchestral instrument (strings, woodwinds, brass and percussion). The orchestra prepares diverse repertoire and performs in concert at the end of each semester. Basic music theory is covered with an introduction to writing music, understanding keys, and fluently reading music and musical form. Homework generally consists of practicing orchestra music and completing other music assignments. Grades reflect weekly preparation, concert participation, chair auditions, attitude and special projects.

Grade: 8

Term: 2-3 Days/Week All Year

## **UPPER SCHOOL**

### **Acting I**

An introduction to fundamental skills of acting. Students will study improvisation, character development and monologue and scene performance. The course is open to 9th-12th grades and is designed for students of all skill levels. This class is a prerequisite for Acting II.

Grades: 9–12

Term: Semester I

### **Acting II**

A workshop for students who are interested in taking their acting to the next level. Students will continue working on their performance skills in addition to learning about script analysis and audition preparation. Students will have some influence in shaping the course of the class based on their interests. Open to 9th-12th grades. Acting I is a prerequisite for this class.

Grades: 9–12

Term: Semester II

Prerequisite: Acting I

### **Art Photography**

Art Photography focuses on photography as an art form. This class is workshop format where the majority of class time is spent in the field or in the lab. Students may respond to assignments digitally or conventionally. Students will learn to communicate visually with photographs in response to specific assignments. Each student will study the fundamentals of camera operation such as: metering, selecting appropriate shutter speeds, depth of field, mode selection, indoor and outdoor lighting techniques, specialized lenses, and tripod use. A great deal of time will be spent learning about composition and the use of symbolism to guide the viewer. Image editing software, Adobe Photoshop CS6 will be utilized in this course. At the conclusion of each assignment, students evaluate and discuss each others photographs in a peer-led critique. Evaluation is based upon participation in critiques, aesthetic content, and technical aspects of each assignment and a final portfolio of work. The final examination will consist of the preparation and presentation of a final portfolio. All students will participate in one or more exhibits.

Each student will be charged a fee of \$85 for film, chemicals, matting supplies, and or digital media supplies.

Grades: 9–12            Term: Semester I or II

### **Art Photography Advanced**

In addition to a more specific exploration of many of the concepts covered in Art Photography I, advanced students will be encouraged to prepare a body of work that is linked technically and conceptually. Advanced concepts will include: developing advanced conceptual frameworks, studio lighting techniques, conceptual portraiture, composites, sequence, symmetrical abstractions, and matting. The final exam will be the production and presentation of a portfolio. Each student will be charged a fee of \$85 for film, chemicals, matting supplies, and or digital media supplies.

Grades: 9–12            Term: Semester II            Prerequisite: Art Photography

### **Ceramics**

The fundamentals of ceramic construction of both functional and non-functional forms will be explored. Each student will learn specific “throwing” techniques, which includes the following: centering, pulling techniques, creating lids, trimming, and form exploration. Students will be required to explore semester objectives that include, bottle forms, bowls, plates, cantilevered forms, and other open forms. Hand building techniques covered include: slip/score, coil, slab, slump, and mold creation and use. Students will also learn a variety of glazing and firing techniques. Evaluation is based upon technical and aesthetic components of each assignment. All students will participate in the year-end exhibit. When repeated for credit, "Ceramics" will be designated "Ceramics II" in the second semester, "Ceramics III" in the third semester, and so on. The advanced Ceramics curriculum goes to Ceramics IV. Students will be charged a fee of \$65 for clay and glaze supplies.

Grades: 9–12            Term: Semester I or II

### **Upper School Choir**

The Choir is open to all upper school students. The course centers on the joy of ensemble singing by building vocal technique and musicianship, learning great repertoire across the choral spectrum, and participating in concerts and festivals. Aside from major concerts at the end of each semester, there are other events: The Halloween concert in October, the Pops Concert in February, and a concert in March. Some concerts are combined efforts with the Upper School Orchestra. The choir--as a whole, as well as individual singers--also participate in events governed by the Michigan School Vocal Music Association (MSVMA): Honors Choir, Solo/Ensemble and the Choral Festival. A wide range of repertoire is explored, from Renaissance and Baroque to Jazz and Broadway.

Grades: 9–12            Term: 3 Days/Week All Year

### **Chamber Singers**

This group is comprised entirely of more advanced members of the high school choir. The singers concentrate on chamber music for small vocal ensembles, including vocal jazz at one end of the spectrum and Renaissance madrigals at the other. Most of the singing is a cappella. Chamber singers will sing on all concerts where the choir appears, as well as some other events where it is not feasible to take the whole choir. Membership is by audition only, and only by members of the choir. The desire and the work ethic to delve into more advanced repertoire are required.

Grades: 9–12

Term: 2 Days/Week All Year

### **Design in Two-Dimensional and Three-Dimensional Media**

This course emphasizes two- and three-dimensional design concepts in metal, found objects, clay, wood, stone, and cement. Each assignment has two parts: 1. Sketching: students work in a sculptural journal to explore conceptual frameworks, sketching ideas, and developing actionable plans. 2. Construction Phase: executing the plan. The concept of “maquettes” or “sculptural prototypes” will be explored as needed to address engineering issues. The focus of each assignment will be aesthetic rather than technical. Students will be encouraged to use symbolism and work with concepts to make the most direct statements. Evaluation is based upon group critiques, application of technical skill, execution, and most importantly how much thought and planning went into a specific work. Students will be charged a fee of \$45 for supplies.

Grades: 9–12

Term: Semester II

### **Introduction to Art I**

This introductory art course meets daily and provides sequential learning activities organized around art elements and principles of design. Students will explore a variety of rendering techniques including drawing, painting, computer aided design, pinhole photography, and clay. A great deal of emphasis will be placed on developing conceptual frameworks to make artistic statements. Students will also learn how to formally mat their work and participate in school-wide exhibits. Group critiques will also be explored.

Grades: 9–12

Term: Semester I

### **Jazz One**

Jazz One is open to all continuing music students interested in practicing and developing the technique and interpretative skills fundamental to performance in the jazz/rock idiom. Improvisation is introduced as a new concept along with various components of music theory, composition and history. As styles are introduced a repertoire is established. This course includes an introduction to the Music Lab, its notation and recording software, and equipment use.

Grades: 9-12

Term: All Year

### **Jazz Lab**

Jazz Lab is open to all continuing music students interested in practicing and developing the technique and interpretative skills fundamental to performance in the jazz/rock idiom. Various components of music theory and history are included to enhance improvisational skills. Other topics may include composition, practice techniques, equipment use and music technology via the Music Lab. Special emphasis is given to analysis and expanding repertoire. Jazz Lab groups are formed each year based on experience and instrumentation, and actively perform within the school and community. This course may be repeated for credit.

Grades: 9–12

Term: All Year

Prerequisite: Jazz One

### **Studio Jazz**

Studio Jazz is open to select self-motivated and collaboration-minded music students interested in improving their skills in jazz/rock improvisation and performance. Various components of music theory and history are included to enhance improvisational skills and emphasize performance. Additional topics may include but are not limited to arranging, composition, transcription and music technology via the Music Lab. This first call ensemble performs numerous times throughout the school year in support of community events, school functions and at formal concerts. This course is open to students by audition or permission of the instructor and may be repeated for credit.

Grades: 10–12

Term: All Year

Prerequisite: Jazz Lab or Jazz Lab

### **Orchestra**

The Upper School Orchestra performs a variety of music in various venues. Students perform several times during the year, and the ensemble accommodates anyone with at least two years' experience on their instrument. Students will improve both personal and ensemble skills through the study and performance of diverse literature. Homework consists of practice and mastery of assigned music; “puzzlers” will include specific excerpts from the assigned music as well as general musicianship covered in class throughout the year. Grades reflect weekly preparation, chair auditions, overall attitude, interaction with classmates, concert participation and special projects.

Grades: 9–12

Term: All Year

### **Chamber Orchestra**

The chamber orchestra is a small ensemble of the most advanced players from Orchestra. This group meets at the discretion of the director, and assumes a high level of technical proficiency. Chamber Orchestra performs regularly in concerts, at school functions and in the community. All students will be offered the opportunity to participate in MSBOA festivals. Students wishing to be considered for the Chamber Orchestra should register for Upper School Orchestra.

Grades: 9–12

Term: All Year

### **Painting**

Painting is a timeless process of creating art with color. Painting allows for the expression of one's thoughts and ideas. In this course, students will explore a variety of mediums, including watercolor, acrylic, and tempera. There will be a focus on composition and the development of ideas in this course. Students will participate in the examination and discussion of paintings from various time periods, and cultures as they explore themes in art. Traditional techniques will be explored, as well as the experimental and abstract. Canvas stretching and surface preparation will be taught in-depth. Painting activities will take place in-studio as well as possible outside locations. Students will also participate in student led class critiques at the end of each unit. Students may repeat this course in order to pursue painting at a more advanced level. There are no prerequisites or final exams. Students will be charged a fee of \$30 for supplies.

Grades: 9–12

Term: Semester II

### **Drawing and Printing**

Art is essentially the act of expressing one's thoughts and ideas visually. Drawing is the foundation of all art forms. This course will explore various aspects of drawing in depth. There will be a focus on drawing techniques including: shading, hatching/cross hatching, gesture drawing, and contour line drawing. Representational art, illustration/comic art, and abstract drawing practices will be covered in this course. Students will explore (but are not limited to) still life, landscape, and figure drawing. There will be a focus on composition, and the development of ideas in this course. Students will experiment with a variety of mediums including: pen and ink, graphite, charcoal, colored pencil, oil pastel, mixed media, and intaglio printmaking. There will be an emphasis on exhibition and portfolio building throughout this course. In addition, students will participate in student led class critiques at the end of each unit. Students may repeat this course in order to pursue a more advanced level. Students will be charged a fee of \$30 for supplies.

Grades: 9–12

Term: Semester I

### **Tech Theatre**

Technical Theatre explores all aspects of technical theatre production including scenery, lighting, properties, costumes, make-up, and special effects. The course utilizes Greenhills School's production program as a laboratory for the practical application of skills learned in class. Theatre safety, collaboration skills and peer leadership are also important elements of the course.

Grades: 9–12

Term: Semester I or II

# *Health and Wellness*

The Wellness Department offers courses designed to provide students with the knowledge, skills and ability to make healthy choices. Classroom curriculum is supported with extracurricular physical activity opportunities offered throughout the year, such as intramural and interscholastic sports programs. The two divisions of Wellness are Physical Education and Health. The Physical Education portion occurs in the gymnasiums and athletic fields, and offers a unique mix of psychomotor, cognitive and affective learning, providing individuals with multiple opportunities to take risks and experience success. The Health portion occurs in the classroom and teaches fundamental concepts to build healthy lifestyles, relationships, and communities through health literacy and promotion. Our goal is to provide an environment that fosters social, emotional, and physical well-being so that students develop:

- Responsible personal and social behavior that respects self and others by remaining respectful of divergent views and beliefs
- Willingness to take healthy risks and embrace challenges
- Recognition of personal values and principles to develop a strong work ethic and the ability to make moral decisions
- Understanding of lifelong fitness and its contribution to a healthy lifestyle

## **MIDDLE SCHOOL**

### **Health 6**

This course is designed to build on student learning and understanding of the following health topics: decision-making, goal setting, social and emotional health, physical health, nutrition, internet safety, the human body, and peer relationships. The course emphasizes the importance of making positive life choices pertaining to common life issues many teenagers experience. Students will have the opportunity to participate in group projects and engage in class discussions.

Grade: 6

Term: 2 Week Rotations, All Year

### **Physical Education 6**

Students participate in daily, vigorous physical activity. Emphasis is placed on physical fitness, skill development, social interaction, proper sports conduct, and the development of a positive self-image. Students participate in individual sports and activities such as tennis, badminton, jump rope, and running as well as team sports such as volleyball, basketball, lacrosse and field hockey. Drills and lead up games support the instructions and competition and tournament play are enjoyed by the students. Students participate fitness testing stations adapted from Fitnessgram.

Grade: 6

Term: 2 Week Rotations, All Year

**Health 7**

This course is designed to build on student learning and understanding of the following health topics: substance abuse prevention, peer and family relationships, body image, self-esteem, emotional health, reproductive health, social media, and internet safety. The course will emphasize the importance of how individuals treat their bodies and their peers on a daily basis, and how each of these aspects contributes to one's health. Students will have the opportunity to participate in group projects and engage in class discussions.

Grade: 7                      Term: 8 Week Rotations, Once a Year

**Physical Education 7**

This course is designed to build upon skills that were introduced in the 6<sup>th</sup> grade. Students participate in daily, vigorous physical activity. Emphasis is placed on physical fitness, skill development, social interaction, proper sports conduct, and the development of a positive self-image. Students participate in individual sports and activities such as tennis, badminton, jump rope, and running as well as team sports such as volleyball, basketball, flag football, team handball, and field hockey. Drills and lead up games support the instructions and competition and tournament play are enjoyed by the students.

Grade: 7                      Term: 8 Week Rotations, Once a Year

**Health 8**

This course is designed to build on student learning and understanding of the following health topics: mental and emotional health, stress management, substance abuse prevention, brain development, healthy relationships, and reproductive health. This course emphasizes the importance of leading a healthy lifestyle, pertaining to common life issues many teenagers experience. Students will have the opportunity to participate in group projects and engage in class discussions.

Grade: 8                      Term: 8 Week Rotations, Once a Year

**Physical Education 8**

This course provides opportunities for skill development, creative expression, teamwork, and lifelong well-being. Students participate in individual sports and activities such as tennis, badminton, jump rope, and running as well as team sports such as volleyball, basketball, softball, and team handball. Drills and lead up games support the instructions and competition and tournament play are enjoyed by the students. Strategies for inclusiveness are emphasized, along with the value of physical activity for health, enjoyment, challenge, and/or social interaction.

Grade: 8                      Term: 8 Week Rotations, Once a Year

## UPPER SCHOOL

### **Minimum Departmental Requirements**

Students are required to take the one-semester health course and the one-semester lifetime fitness course to meet graduation requirements.

### **Health**

This semester-long health course is required for students and presents developmentally appropriate material to address a variety of health topics. As the adolescent years are ones of great change and growth, this course aims to address the emotional, social, and intellectual aspects of Wellness. Topics to be covered include: physical health, nutrition, reproductive health, stress management, emotional well being, substance abuse prevention, epidemiology, and global public health issues. Focus begins on the individual in the classroom gradually leading to a broader perspective exploring global health issues. We aim to create a safe environment for students to ask questions and share concerns. Students achieve a high level of health literacy to enable them to make healthy choices while being introduced to the fundamentals of health through a global perspective.

Grade: 9-12

Term: 5 Days/Week, Semester I or II

### **Lifetime Fitness**

This class brings a lecture/lab approach to Physical Education; meaning there will be concepts which students will learn and then use that knowledge to directly affect their bodies. In doing this they will utilize equipment related to fitness, technology, assessments, team work, field trips and independent studies. A big focus will be put on the five components of health-related fitness, including muscular strength, muscular endurance, cardiovascular endurance, flexibility and body composition. They will have the opportunity to explore many types of fitness so that they're prepared to make healthy choices for their futures! By the end of this course they will have the knowledge to prepare and evaluate their own fitness plans not only on paper, but through the physical process.

Grade: 9-12

Term: 5 Days/Week, Semester I or II

# *History and Social Science*

## **MIDDLE SCHOOL**

### **Sixth Grade Social Studies**

The focus of sixth grade social studies is world geography. Students learn about the relationship people have with the Earth and develop a foundation of the skills utilized in the history and social science fields. Major topics may include: global food supply, standard of living, human migration, population, human rights, and globalization. Students learn about these topics in a variety of ways, including using charts, graphs, primary and secondary texts, and research. Students also use a variety of technology to access and evaluate information and to enhance learning. Each semester students complete a long-term research project. First semester, students create a virtual tour of a National Park using GoogleMaps. The second semester is focused on the human experience and students will take a deep dive into demographic data and write a research paper and create a multimedia presentation as they further develop their research skills.

Grade: 6

Term: 5 Days/Week, All Year

### **American History 7**

This course is an introductory survey of American History with attention given to the role of geography, the development of diverse cultures, the creation of the U.S. government structures and systems, and the impact of various people on the development of America. Historical topics include indigenous American civilizations, European exploration and colonization, the American Revolution, Manifest Destiny, slavery and the Civil War, Reconstruction and the rebuilding of the Union, the Industrial Revolution, the United States imperialism, the Depression, World War II, and the Cold War. Throughout the year, students complete primary and secondary source readings, various assessments, group projects, oral presentations, role plays and analytical writing assignments.

Grade: 7

Term: 5 Days/Week, All Year

### **Foundations of Civilization**

This introductory course takes an exciting look at our human past and the origins of civilizations. You will be introduced to some of the major civilizations of the Ancient World (from the first humans to the Mongolian Empire). We will explore the growth and increasing complexity of human societies from all over the globe, as well as the increasing interactions that occurred between them. We will examine the patterns and processes of these civilizations, as well as the unique developments of particular regions and people through multiple perspectives and lenses: political, economic, social, and cultural. In this course, we will address essential world history questions, such as: What makes us human? What constitutes a civilization? How can we learn from the past and how do we determine what is important? Throughout the year, we will complete readings from primary and secondary sources and artifacts, engage in interactive activities and role

plays, and create presentations, debates, and analytical writing assignments.

Grades: 8

Term: 5 Days/Week, All Year

## **UPPER SCHOOL**

### **Minimum Departmental Requirements**

3 Credits: at least one credit in World History (Foundations of Civilization or Modern World), one credit in United States History, and/or one credit from electives. *Note:* If both World History courses are taken, the second credit in World History can fulfill the additional elective requirement.

### **Foundations of Civilization**

In this course, we study the human past from Paleolithic Era through the Middle Ages. We will explore the growth and increasing complexity of human societies, as well as the increasing interactions that occurred between them. We will try to understand patterns and processes that occurred in human societies across the globe, while also looking at unique developments and cultures of particular regions and civilizations. In this course, we will address essential world historical questions, such as: What makes us human? How has the changing relationship between human beings and the physical and natural environment affected human life from early times to the present? How and why have human societies and relations become so complex since early times? How and why have human worldviews changed over time?

We will also build historical thinking skills by addressing essential questions for the discipline, including: What is important in the past? What has changed and what has remained the same? Have things changed for better or worse? How do we make sense of the raw materials of the past? How can we understand the choices of predecessors who had different moral frameworks and worldviews?

Grades: 9-10

Term: All Year

### **Modern World History**

World history is the study of global patterns, processes, interactions, and exchanges across a vast sweep of time and geographical space. The global perspective that studying world history provides allows us to account for both similarities and differences among the world's peoples and societies, and it provides a global context with which to better understand our world, our nation, and ourselves.

In this course, we will use a variety of scholarly texts, historic documents, images, and accounts to address key world historical questions, such as:

What experiences and characteristics do we as humans share? What accounts for our differences? How have human interactions and relations changed over time? How has the relationship between humans and their environment changed over

time, and what has been the impact of those changes? How have human views of the world, nature, and the cosmos changed? How can knowledge of the world's history inform our understanding of the world around us?

Our focus will be the history of the world since the latter half of the 15th century or since European exploration brought about the convergence of both hemispheres and initiated the first truly global system.

Grades: 10-12, with priority given to 10th graders

Term: All year

### **United States History**

This class is a chronological survey of United States history from exploration and colonization through modern America. Attention is given to political, social and cultural themes and how they interact with each other. Economic, geographic and scientific impact on history is also examined. A narrative text, primary, and secondary sources provide a basis for student background and understanding.

Students are expected to participate in class discussions, work on individual and group projects, write historical essays, and take structured quizzes and tests. Research of historical and cultural events is also a part of the class.

Grade: 11

Term: All Year

### **AP United States History**

A survey course of United States history proceeds chronologically involving topics from exploration and colonization through modern America. The development of the American political system, economy, society and culture are examined and contribute to an understanding of our way of life. While a narrative text is used, students also examine primary sources and secondary materials. Course reading is quite extensive and essay writing frequent. Assignments are often problem based and designed to provoke questioning and inquiry and in addition, active participation by students is considered an essential component of the class.

Grade: 11  
required

Term: All Year

Department approval

### **AP Micro Econ**

Microeconomics is the branch of economics that studies how people make decisions and how their decisions interact. This semester-long course provides a basic introduction to the functioning of economic systems at the micro level, which includes entities such as individuals (consumers and producers) and specific markets. We will explore how the scarcity of resources necessitates consideration of trade-offs by individuals and creates the need to make choices. We will examine how individuals make economic choices, using cost-benefit analysis and, in particular, marginal analysis. We will study the model of consumer behavior and critically evaluate the rational man assumption that underlies

it. We will study multiple models of producer behavior, each relevant to one of four types of market structure -- perfect competition, monopoly, oligopoly, and monopolistic competition. We will learn how to evaluate market outcomes using the concept of economic efficiency, and underscore the efficiency-equity trade-off faced by society. We will explore how the existence of market power in certain types of market structures distorts economic efficiency and reduces society's welfare, as do other sources of market failure such as externalities, public goods, and imperfect information. We will examine the role of government intervention in moving a society closer to a desired outcome, by creating appropriate incentives and disincentives. The analytical models we will study are heavily based on algebra, graphs, geometry, and intuition. We will learn how to apply these models as problem-solving tools, not just to understand past and current market events and outcomes, but also to predict market responses to potential events in the future. In short, this course will teach you how to think like a microeconomist.

Grades: 10-12, with priority given to 12th graders

Term: Semester I

### **AP Macro Econ**

Macroeconomics is the branch of economics that is concerned with overall ups and downs in the economy. This semester-long course provides a basic introduction to the functioning of economic systems at the macro i.e. the aggregate level, which includes entities or sectors such as households, firms, the government, the Federal Reserve Bank, and the rest of the world. We will explore how the key sectors of the economy interact via factor markets, product markets and financial markets, generating flows of funds among them. We will define various macroeconomic indicators commonly used to track macroeconomic performance, such as aggregate output (GDP, real GDP), aggregate price level (CPI, PPI, and GDP Deflator), unemployment rate, inflation rate and economic growth rate. We will learn how these indicators are measured, and use them to examine business cycles (booms and busts) as well as the long-term growth record of the U.S. since the Great Depression. We will examine issues such as – what are the limitations of GDP as a measure of economic wellbeing, what are the sources of unemployment, and who are the winners and losers from inflation. We will learn the model of the macroeconomy that explains its behavior, and illustrates how the government's fiscal policy and the Fed's monetary policy might be useful in stabilizing the economy. We will explore topics such as the pros and cons of budget deficits and government debt, and what defines and determines a nation's money supply. We will study how international trade and finance impact the macroeconomy, particularly the value of the dollar. The analytical models we will study are heavily based on algebra, graphs, and intuition. We will learn how to apply these models as problem-solving tools, not just to understand past and current U.S. macroeconomic performance, but also to predict macroeconomic responses to potential events in the future. In short, this course will teach you how to think like a macroeconomist.

Grades: 10-12 with priority to 12th graders

Term: Semester II

## **Big History**

Big History is a problem-based, technology-rich, multidisciplinary approach to history that places the human past within the largest context possible, from the beginnings of the universe up until life on the Earth today. It unifies history, literacy, and the humanities with the latest findings in astronomy, physics, biology, geography, geology, climatology, prehistory, archeology, anthropology, cosmology, natural history, as well as population and environmental studies.

Students investigate a range of questions connected to our past, including: Where does the historical story begin? How do different people know something is true? How do we use the concepts, tools, methods and questions of different disciplines to investigate essential questions? What happened after the Big Bang? How did our earth form and take shape? What were our earliest ancestors like and how did they live? What were the consequences of agriculture? How did/do humans manage larger and more complex communities? How has the world grown more interconnected? Why has change accelerated in the last 500 years? How was the world transformed in the last hundred years? What can we know about the future? In studying these questions, Big History students will deepen their understanding of important historical, scientific, geographic and cultural concepts.

Grades: 10-12, with priority given to 12th graders    Term: All Year

## **The History of Art & Architecture**

Have you ever wondered how Greek pottery tells a tale of an ancient civilization? Or how the Hagia Sofia reveals secrets of the conquest and conquering of modern religions? The History of Art and Architecture is a survey course of global history that will look at the stories of civilizations and cultures through objects. The course will peer into different time periods and peoples spanning the globe: ranging from the usual suspects, who are the foundations of western society, to the dynasties and kingdoms of North and West Africa, the Middle East, and Southeast Asia. Students will learn how different objects or architectural feats were influenced by and/or drove change within a particular culture. The course will culminate with students being asked to not only create their own virtual museum exhibits to tell a story, but also with a potential visit to a local museum to complete a field study.

Grades: 10-12, with priority given to 12th graders    Term: Semester I

## **Contemporary Global Issues and Connections** (formerly *Global Crisis*)

Our world has become increasingly interdependent. Social, economic, political, environmental, and other issues and problems originating in one part of the world often have far-reaching ramifications in other parts of the world. This course is designed to inform, to provoke, and most especially to inspire you to think seriously about pressing political, economic, social, and ecological concerns in the contemporary world. We will

focus on the importance of analyzing multiple perspectives and exploring cultural bias while engaging technology and evaluating how recent events have shaped the world in which we live. Using academic readings, videos, data, and research, you will work collaboratively to expand your thinking about global issues, understand the surrounding cultural and social contexts, and explore possible solutions in a changing world.

Grades: 10-12, with priority given to 12th graders

Term: Semester I

### **Introduction to Sociology: Difference, Power and Discrimination**

What is society? How can we understand it? What is the role of the individual in society, and how does society affect individual lives? This course is an introduction to the complex and fascinating scientific study of human behavior and the forces that shape society. We will engage in critical thinking about social and cultural issues and gain exposure to different types of sociological research. We will discuss and acquire a familiarity with the concepts sociologists typically use in their work. For instance, we will engage in activities which further our understandings of the various scientific methods (e.g., engaging in community field work to make observations and collect quantitative data). This course pays particular attention to the broad sociological concern of social inequality as it pertains to race, class, gender, and sexuality.

Grades: 10-12, with priority given to 12th graders

Term: Semester II

### **U.S. Government and Citizenship**

In these times, an informed and engaged electorate has never been more important. To that end, this course will provide students with the understanding and background which will allow them to take their place as active participants in American democracy. After a quick review of the historical and philosophical underpinnings of our government, each of the three branches, (legislative, executive and judicial), will be examined in detail. Next, the development, purpose and current role of political parties will be studied. This unit will also include a look at the modern electoral process. Students will examine the impact that “media” in all its traditional and new forms has on our political decisions. Another unit will consider how interest groups, lobbyists and the role of money act to sway governmental decisions. Lastly, the course will focus on state and local government with an emphasis on ways in which citizens can be empowered to engage in the decision making process. Students will be expected to participate in discussions about current events so that they can better understand and apply what they are learning. Instructional techniques will include lecture based discussions, individual and group research projects and presentations, outside readings, and current documentaries.

Grades: 10-12, with priority given to 12th graders

Term: Semesters I or II

### **Introduction to Psychology**

During Introduction to Psychology students will study aspects of the human experience that high school students typically find interesting and relevant:

- Happiness and strategies for increasing resilience and optimism
- Consciousness, sleep, dreams, and drugs
- The relationship between the individual and social groups, for example, why people obey and conform, love and aggress against each other
- How we learn and remember
- The brain and the relationship between the brain and behavior
- Psychological research strategies
- How people develop emotionally, socially, and intellectually across the lifespan
- Psychological disorders and the various treatments for psychological disorder

Additionally, students will develop the following skills during this course:

- Application of a psychological lens through which to understand human behavior, emotion, and thought.
- Critical evaluation, both in writing and in discussion, of the interplay between the social, biological and psychological.
- Evaluation of the kind and quality of psychological research data that inform us.
- Exposure to the APA style of writing and research presentation

Grades: 10-12, with priority given to 12th graders

Term: Semester II

### **Introduction to Political Philosophy**

According to the philosopher Jonathan Wolff, it's been said that there are really only two questions in political philosophy: "Who gets what?" and "Says who?" In this course, we'll examine these central questions and the others that arise when we try to answer them. We'll ask questions like: What is politics, and what makes our approach distinctly philosophical? What would life be like without government? What justifies the existence of political arrangements? Who should wield power, and why? How much freedom can and should we maintain in the face of state power? How are rights, liberties, property, and other goods to be distributed? What responsibility, if any, does the state have to groups instead of individuals? Finally, what's left out by the traditional ways of framing the questions of political philosophy? In our explorations, students will study the works of major thinkers both past and present in order to sharpen their ability to think critically and express themselves clearly, engage peers in respectful dialogue, and develop valid arguments. Students should emerge from the course with a greater understanding of themselves as -- in Aristotle's famous formulation -- "political animals," including the lifelong necessity of grappling with political questions.

Grades: 10-12, with priority given to 12th graders

Term: Semester II

# *Mathematics and Computer Science*

Greenhills mathematics teachers are mathematicians and educators. We love our subject, enjoy the art of using mathematical models to solve problems, and embrace the science of continuously improving our pedagogy.

## **Department's Instructional Goals:**

We want our students to:

- *Practice* effective techniques to learn mathematics; to develop study skills, the ability to find and use resources; to ask questions; and become confident in their own problem solving abilities.
- *Understand* that problem solving is a process: It is repeatable; students can try something and be willing to revise and extend their results, to accept that mistakes and adjustments are part of the method.
- *Gain* effective technical communication skills: Students should be able to describe math concepts verbally; write about mathematics with precision; use terminology correctly; and communicate their processes clearly.
- *Use* technology, software, and calculators appropriately: Students should recognize that accuracy and freedom from monotonous calculation are complemented by an understanding of what the calculator is doing, and an appreciation of the limitations of technology. The ability to understand programming, error, and precision are integral to the effective use of technology.
- *Master* the fundamental concepts, big ideas, and skills of mathematics; pattern recognition, generalization, reasoning and proof; skills with numbers, ratio and proportion; reasoning with symbols; estimation; understanding of functions and sets; logical operations, the role of variables: We want our students to feel the interconnected nature of mathematics.
- *Link* the study of mathematics to the role of mathematics in the “real” world; applications; strengths and limitations of mathematical models; the importance of assumptions and interpretations; the ability to ask questions and interpret mathematical methods and results graphically, symbolically, verbally and numerically.
- *Recognize* the creativity and beauty of mathematics and its centrality: To believe in the accessibility of math and its importance; the potential of every individual to do well in any challenging field with appropriate support. We hope that each student will learn to negotiate the tension between the mastery of skills and the understanding of concepts.
- *Appreciate* the efficacy of deductive reasoning and critical thinking skills; to celebrate the role of proof; assumptions; the formulation & testing of hypotheses, and the axiomatic basis of mathematical systems.
- *Contextualize* the history of math with connections across and within other disciplines: Grow to see that math underlies everything.
- *Become* intelligent and numerate consumers of mathematical information. Interpret, analyze, and represent data in a variety of forms; equations, tables, and

graphs; to identify misleading information and to become conversant with the ideas of risk and certainty.

## **Curriculum Overview**

The Greenhills School Department of Mathematics is dedicated to providing our students with a rigorous and comprehensive program of college preparatory mathematics. The curriculum has six major content strands woven throughout each course: Number and Operation, Measurement, Algebra, Geometry and Spatial Reasoning, Statistics and Data Analysis, and Topics in Discrete Mathematics. We embrace problem solving as an important life skill, and believe that every student, with proper support and challenged appropriately, is capable of the successful mastery of mathematics.

Our core program takes students through a three-year Middle School sequence designed to build on the students' understandings of numerical algorithms and thinking and begin to generalize those skills into abstract algebraic reasoning. The faculty is continuously refining the sequence of skills and concepts presented in light of current research on brain development and learning profile, to ensure that each student's program is appropriately challenging and accessible.

In the Upper School, students progress through a three-year program that leaves them prepared for success in college level mathematics. The traditional sequence of Algebra/ Geometry/ and Pre-Calculus topics is complemented by the inclusion of topics in Discrete Math and Statistical Analysis in each course. At the end of this basic program, a number of year-long and semester electives are available, including the option to earn college credit for Advanced Placement Statistics, AP Computer Science Principles, AP Computer Science, and/ or AP Calculus AB and BC. Finally, a research option is available for students with significant interest in pure or applied mathematics.

Required courses are offered at two levels of depth and pace: Regular and Honors. Students may also move through the required series of courses at an accelerated pace with the recommendation of the department; as their maturity, interest, and abilities develop. Placement is determined using objective measures such as formal assessment and previous grades, as well as teacher recommendation and student interest. Courses are designed so that placement from year-to-year can be flexible, and teachers encourage students to consider the challenge of a faster paced course if that is appropriate, as well as a slower paced course as indicated. Our goal is for every student to experience success in at least one semester of college level mathematics before graduation, so care is taken that the course sequence is managed properly.

We encourage students to develop as learners by supporting choice in the program after the minimum requirement (Algebra II) has been met and by encouraging students to take an active role in seeking help and in articulating their needs. Success in college level mathematics depends not only on a student's acquired skills but also on the ability to find support, embrace problem solving as a creative enterprise, and rebound from mistakes.

Teachers are committed absolutely to providing the support necessary for students to become confident practitioners and consumers of mathematics at the college level and beyond.

## **MIDDLE SCHOOL**

### ***Grade 6***

#### **Math 6**

This course uses an integrated curriculum that places fractions, percent, decimals, two-dimensional geometry, probability and statistics in a context relevant to middle school students. Instruction stresses the learning of mathematical skills, problem solving, reasoning, communication of ideas, connections between ideas, and representation of ideas in a variety of ways. Hands-on activities and authentic/performance-based assessments are incorporated with traditional lectures and paper test. Organization and study skills are also taught as an integral part of the class.

*A scientific calculator is required for this course.*

#### **Pre-Algebra 6**

This course uses an investigative curriculum that places ratios and proportions, variables, linear equations, three-dimensional geometry, and probability and statistics in a context relevant to middle school students. Instruction stresses the learning of mathematical skills, problem solving, reasoning and proof, communication of ideas, connections between ideas, and representation of ideas in a variety of ways. Hands-on activities and authentic/performance-based assessments are incorporated with traditional lectures and paper test. Organization and study skills are also taught as an integral part of the class.

*A scientific calculator is required for this course.*

### ***Grade 7***

#### **Pre-Algebra 7**

This course has a broad-based integrated mathematics curriculum, which will enable students to make the transition to college preparatory mathematics. Students develop algebraic thinking skills while reinforcing basic math skills. Topics include solving equations within the real number system; analyzing and graphing linear equations and inequalities; collecting, analyzing and displaying data; probability; geometric shapes and definitions in both two and three dimensions; area and volume; and spatial visualization. A variety of materials and hands-on activities are provided so that students experience varied approaches to problem solving, increasing students' abilities and awakening their curiosity.

*A scientific calculator is required for the course.*

### **Algebra Ma**

Algebra Ma is the first half of a standard high school Algebra I course, and is followed by Algebra Mb. The focus of this first year of the course is on linear relationships, which are investigated verbally, numerically, graphically and symbolically. In addition, students work with linear applications in Geometry, statistics, and data analysis, in order to fully understand the nature of linearity. Students begin to gain practice with the symbolic manipulations that are part of the traditional practice of Algebra. Problem solving, investigations within collaborative groups, the refinement and extension of algorithmic skills, individual work and the use of appropriate technology are features of the coursework, and students work to develop efficient classroom behaviors and consistent habits of preparation.

*A graphing calculator (TI-83, 83+, or TI-84) is required.*

### **Algebra Mb (7)**

This is a standard first-year algebra course, offered in the Middle School. This section is similar to the Algebra Mb offered in the 8<sup>th</sup> grade, but is open to 7<sup>th</sup> graders based on interest, maturity and performance on objective assessments. Operations on real numbers and the concepts of variables and equations are stressed throughout the course. Topics include open sentences in one and two variables, systems of equations, graphing of linear functions, polynomials, factoring, algebraic fractions, exponents, radicals, quadratic functions and equations, and fractional equations. Students use the graphing calculator to graph equations and analyze data as well as to find the best-fit line for a set of data. A variety of applications are stressed throughout the course. The final exam in June is a comprehensive two-hour exam.

*A graphing calculator (TI-83, 83+, or TI-84) is required.*

### **Grade 8**

#### **Algebra Mb**

This is the second half of the standard first-year Algebra course. It follows Algebra Ma. Students who are successful in Algebra Mb will be prepared to take Honors Geometry in ninth grade and Algebra 2 (Regular or Honors) in tenth. Algebra Mb completes the standard high school Algebra I course with a focus on symbolic manipulations of the linear topics explored in Algebra Ma, and a complete treatment of quadratics. Topics include open sentences in one and two variables, systems of equations, graphing of linear functions, polynomials, factoring, algebraic fractions, exponents, radicals, quadratic functions and equations, and fractional equations. Students use the graphing calculator to graph equations and analyze data as well as to find the best-fit line for a set of data. A variety of applications are stressed throughout the course. The final exam in June is a comprehensive two-hour exam.

*A graphing calculator (TI-83, 83+, or TI-84) is required*

#### **Algebra M**

This is a standard first-year algebra course, offered in the Middle School. Operations on real numbers and the concepts of variables and equations are stressed throughout the course. Topics include open sentences in one and two variables, systems of equations,

graphing of linear functions, polynomials, factoring, algebraic fractions, exponents, radicals, quadratic functions and equations, and fractional equations. Emphasis is placed on understanding functions as relationships between sets. Students use the graphing calculator to graph equations and analyze data as well as to find the best-fit line for a set of data. A variety of applications are stressed throughout the course. The final exam in June is a comprehensive two-hour exam.

*A graphing calculator (TI-83, 83+, or TI-84) is required.*

### **Geometry M**

Geometry traditionally follows Algebra and is the course that introduces students to Mathematics as an academic discipline. The mastery of the facts of plane, 3-dimensional and co-ordinate Geometry, triangle trigonometry, area and volume, constructions, and transformations is followed by an investigation of the system of definitions, axioms and theorems first completely articulated by the ancient Greeks. Inductive and deductive reasoning are explored, and students begin to work with formal proof and the nature of mathematical certainty. These ideas are extended into other mathematical disciplines such as number theory and inference. Critical reading and mathematical writing are components of the course, and technology ranging from Euclidean compass and straight edge construction to dynamic geometric software is employed. Connections to the algebraic representations with which students are already familiar are highlighted, and mathematical ideas, such as area as an accumulator and right-triangle trigonometry, which will be featured in future courses, are foreshadowed. The Geometer's Sketchpad is used as an investigative tool, along with other enrichment activities.

### ***Middle School Computer Science***

The Computer Science program at Greenhills was developed to address the competencies needed for a strong foundation in this continually evolving academic area. The curriculum is based upon guidelines suggested by the Computer Science Teachers Association (CSTA,) and seeks to prepare students to function in a technology-rich learning environment, to use technology appropriately and ethically, and to develop the ability to use technology as a problem-solving tool. Students should graduate from Greenhills able to pursue Computer Science as an academic choice, either as a major or minor area of study. The Computer Science teachers work with the Math Department to develop curriculum related to programming and hardware, and with the Department of Information and Technology to integrate appropriate skills and competencies both vertically and horizontally.

### **Grade 6: Responsible Network Use**

Students learn how to operate on a network, to use the universal applications for word processing, computation, and presentation. Connections are made to the students' work in the core academic areas including science, math, English and social studies. Appropriate and ethical uses of the network and the Internet are developed and the role of technology as a learning tool and as a changing element in society is discussed. In addition, students learn to approach more sophisticated applications in systematic ways,

including Publisher, music and art applications, and some elementary gaming. *(This course is offered through the Department of Information & Technology Services)*

### **Grade 7: Hardware Essentials and Intro to Robotics**

Students learn about the ubiquitous presence of computers in our world, from the microchip in a favorite toy to the way that Greenhills' data wall interacts with the School's weather station and how, exactly, we can retrieve and use the data gathered to make decisions. Students build circuits, are introduced to Robotics, and experiment with a variety of hardware interfaces to try to answer the question, "How does the computer turn electricity into function?"

### **Grade 8: Software Essentials and Intro to Programming**

Students continue to learn about the design and function of basic hardware systems, and they begin to think about how to bend the computer to their own needs, to manage and enhance their lives and their learning. They begin to understand the nature of programming as the key to its use as a problem-solving tool. Students become proficient with programming the Graphing Calculator and programming in Scratch, as well as other online applications. Ethics and responsibility figure greatly in this component of the Middle School CS course, as students take on roles as leaders in the MS.

## **UPPER SCHOOL**

### **Algebra I, IH**

Algebra is a method of examining relationships between sets of numbers, called functions, by defining operations on sets. Until the early 18<sup>th</sup> century, this occurred verbally, numerically, and geometrically. The substitution of symbols for numbers is a relatively late development in the History of Mathematics, but mastery of the manipulation of these symbols has come to be the focus of the modern Algebra I course. This class focuses on the underlying concepts and on their symbolic representations by practicing particular skills and then applying these skills to solving problems and modeling relationships in Statistics, the Sciences and the Humanities. Topics include expressions, equations, operations, linear and quadratic functions, integers and rational numbers, inequalities, simultaneous equations, exponents and roots, simple polynomials, rational expressions and equations and, time permitting, sequences. Heavy emphasis is placed on the connection between the analytical solution to a problem and the graphical: the graphing calculator is used extensively but not exclusively in the analysis and verification of solutions.

While it is understood that many students will have had experience with Algebra prior to taking this course, the class is designed to both reinforce foundational skills and to explore the theoretical underpinnings and practical applications of algebraic techniques before continuing with the math sequence.

The difference between Algebra I and Algebra IH is one of pace and time spent on connecting the abstract language of Algebra to the concrete applications of the subject, as well as time spent to practice specific skills. Students enrolled in "regular" sections who

wish to move to an honors section need to earn a year grade of 95% or above, and to obtain the permission of the department.

### **Geometry, Geometry H**

Geometry traditionally follows Algebra and is the course that introduces students to Mathematics as an academic discipline. The mastery of the facts of plane, 3-dimensional and co-ordinate Geometry, triangle trigonometry, area and volume, constructions, and transformations is followed by an investigation of the system of definitions, axioms and theorems first completely articulated by the ancient Greeks. Inductive and deductive reasoning are explored, and students begin to work with formal proof and the nature of mathematical certainty. Critical reading and mathematical writing are components of the course, and technology ranging from Euclidean compass and straight edge construction to dynamic geometric software is employed. Connections to the algebraic representations with which students are already familiar are highlighted, and mathematical ideas, such as right-triangle trigonometry, which will be featured in future courses, are foreshadowed. The Geometer's Sketchpad is used as an investigative tool, along with other enrichment activities.

The difference between Geometry and Geometry H is one of pace and time spent on the mastery of the facts of plane Geometry, practice writing with precision, and some emphasis on abstract reasoning. Students in an Honors section are expected to possess good study habits, and should be able to work independently. Students enrolled in “regular” sections who wish to move to an honors section need to earn a year grade of 95% or above, and to obtain the permission of the department.

After successful completion of Geometry, students are well prepared for the SAT Math Level I Subject Test.

Prerequisite: Completion of Algebra I with a grade of C- or better or Permission of the department. Students wishing to continue in the “H” sequence are expected to maintain at least a B average.

### **Algebra II / Algebra III**

The course begins with a review of algebraic structures like operation, function and relation. These ideas are extended into the algebra of transcendental and discrete functions, and trigonometric functions are formally introduced. The complex number system is developed, and the ancillary completeness axioms discussed. The algebra of matrices is formally explored, and matrices are used as models to solve a wide variety of problems, including Markov Chains if time permits. The use of linear, exponential and power functions to model transformed data is explored, as well as the Gauss function's role as a model of naturally occurring phenomena.

The difference between Algebra II and Algebra II H is one of pace and the level of sophistication of the applications studied. Students in an Honors section are expected to possess good study habits, and are expected to be able to work independently. Students

enrolled in “regular” sections who wish to move to an honors section need to earn a year grade of 95% or above, and to obtain the permission of the department.

Prerequisite: Completion of Geometry with a grade of C- or better or Permission of the department. Students wishing to continue in the “H” sequence are expected to maintain at least a B average.

### ***Electives***

The completion of Algebra II signals the end of the required sequence of instruction, and may also complete the three-year Math requirement at Greenhills. Many students will have completed Algebra II before the end of the Sophomore Year, however, and will need to complete at least one additional year of mathematics. It is strongly recommended that students continue to study Mathematics for all four years of Upper School.

Electives (with some exceptions) are semester courses and, unless otherwise noted are offered each semester, for  $\frac{1}{2}$  credit.

### **Analysis**

This course builds upon the ideas and skills covered in Algebra II, with an emphasis placed upon using the tools developed in Algebra and Geometry to solve an array of interesting, real-world problems. Exponential growth and decay, logistic models, data transformations and series are employed to analyze problems in physics, economics, medicine, and chemistry, among other areas. The course also provides a chance for students to solidify their algebra skills before continuing to topics usually covered in college level coursework.

Term: All Year

Prerequisite: Completion of Algebra II with a grade of C- or better or permission of the department.

### **Functions**

This course touches on topics first developed in Algebra II but with a focus on more theoretical aspects of the underlying mathematical structures. Rational and transcendental functions are thoroughly explicated, and there is a heavy emphasis on trigonometry, including units covering circular functions, right triangle trigonometry, graphs, identities, equations, proofs, and applications of the Laws of Sines and Cosines. In addition, a formal study of sequences and series begins. Functions are viewed as elements of a set upon which an algebra is defined, and the idea of inverse and identity elements of that set are formally investigated within that framework. Students work with functions and relations in a variety of representations, explicitly and implicitly defined, in polar and in parametric form. The idea of a limit is introduced. Students hoping to take AP Calculus BC must take Functions, and should consider also taking Analysis and/ or

Pre-Calculus. Functions is a very fast paced course and should only rarely serve as a student's only exposure to Pre-Calculus mathematics.

After successful completion of Functions, students are well prepared for the SAT Math Level II Subject Test.

Term: Semester I

Prerequisite: Completion of Algebra II H with a grade of 89% or better and permission of the department.

### **Pre-Calculus**

Pre-Calculus formally reviews the concepts from Algebra and Geometry which are essential to the study of calculus, and introduces some techniques not previously seen, such as partial fractions and sophisticated work with absolute values and vectors, as well as a review and continued study of sequences and series, which will be needed in the study of calculus. A rigorous and comprehensive study of coordinate plane trigonometry and modeling with sinusoidal functions is included. A treatment of the Limit is undertaken, and much work is done with application problems surrounding rates-of-change and the geometry of tangent and secant lines.

After successful completion of Pre-Calculus, students are well prepared for the SAT Math Level II Subject Test.

Term: All Year

Prerequisite: Completion of Algebra II with 84% or better; Completion of Algebra II H with 80% or better; or Completion of Analysis with 70% or better

### **Intro to Statistics**

This course is a non-AP introduction to Descriptive Statistics and the fundamentals of Experimental Design. The course begins with descriptions of univariate data, including measures of center, spread, variation, as well as the shape of a distribution and unusual features. Then, bivariate data are explored via linear regression, including regression on transformed data. Discussion of correlation and variance lead to the essentials of design, including the difference between a study and an experiment, the idea of statistical evidence, and the role that randomization plays in the practice of inference.

Term: Semester I

Prerequisite: Algebra II

### **Financial Applications**

This course applies Math through Algebra II to topics in personal financial literacy. Students will learn about the vocabulary of personal finance, develop a solid understanding of the workings of major instruments for borrowing and investing, and see how their mathematical and statistical skills will apply to the day-to-day exercise of personal finance. Emphasis will be placed on the risk-return tradeoff, and overall financial fitness to enable students to make sound financial decisions throughout their

lives. Financial literacy and financial fitness are essential life-skills in today's volatile and highly competitive economy. This class has the power to change the financial course of your life!

The course will incorporate many hands-on activities including reading the financial news, collecting and interpreting financial data, writing brief analytical news-story pieces, problem-solving, using the computer/calculator for spread-sheeting and financial computations, and participating in personal finance simulations and games.

Term: Semester II

Prerequisite: Algebra II

### **Calculus A**

This is the first of 3 semesters of AP Calculus offered at Greenhills. Upon the completion of Calculus B or C, students elect to take the AP Calculus AB or BC exam in the spring, and can earn college credit or exemption. The A Semester is centered on Differential Calculus, including a full treatment of the concepts of a limit and continuity. The Intermediate Value Theorem and the Mean Value Theorem are examined. Applications of the derivative include extreme value problems, related rates, curve sketching, elementary differential equations, and the practical meaning of the instantaneous rate of change. Students finish the semester with an introduction to the anti-derivative and the Fundamental Theorem of Calculus.

Term: Semester I or II

Prerequisite: Completion of Functions or Pre-Calc with a grade of B- or better and permission of the department.

### **AP Calculus B**

This is the second of 3 semesters of AP Calculus offered at Greenhills. Upon the completion of Calculus B or C, students elect to take the AP Calculus AB or BC exam in the spring, and can earn college credit or exemption. The B Semester is centered on Integral Calculus and includes a complete treatment of differential equations. Applications of the integral include area and distance problems, volumes of solids of known cross sections and of solids of revolution, and the practical meaning of the integral as an accumulator. At the end of the spring semester students complete a comprehensive review and prepare for success on the AP Calculus AB Exam. AP Calculus A & B is equivalent to a first semester of Calculus at the university level.

Term: Semester I or II

Prerequisite: Completion of Calculus A with a grade of C or better and Permission of the department.

### **AP Calculus C**

This is the final semester of AP Calculus offered at Greenhills. Upon the completion of Calculus C, students elect to take the AP Calculus BC exam in the spring, and can earn college credit or exemption. The study of calculus continues with the use of Infinite

Series to approximate transcendental functions in order to integrate them. In addition, differential and integral calculus topics from the A and B semesters are applied to functions expressed parametrically and in polar form, which leads to a discussion of the application of Calculus techniques to Vector Algebras in order to solve problems in Physics. At the end of the spring semester students complete a comprehensive review and prepare for success on the AP Calculus BC Exam. AP Calculus B & C is equivalent to two semesters of Calculus at the university level.

Term: Semester II

Prerequisite: Completion of Calculus B with a grade of C or better and Permission of the department; Completion of Functions or permission of the Department

### **Multivariate Calculus**

This semester course provides closure to the topics begun in Calculus B by extending Vector Calculus from 3 into multiple dimensions, and exploring the mathematics of  $n$ -space. Students work with lines, planes, and curves and surfaces in 3-dimensions symbolically, graphically and numerically, and apply a variety of techniques including differentiation and integration to the study of these structures. Students may opt to take the course concurrently with *Physics with Calculus* to experience the ideas from both perspectives.

Term: Semester I

Prerequisite: Completion of Calculus B with a grade of C or better and permission of the department.

### **AP Statistics**

Another Advanced Placement Course that allows students the experience of a college level course during Upper School. The first semester includes an overview of Descriptive Statistics, a discussion of Experimental Design, and a unit on Probability. Second semester focuses on inferential statistics and preparation for success on the AP Statistics Exam in the spring. There is a strong component of critical reading and writing in both semesters, as well as the use of appropriate technology. AP Statistics is equivalent to a non-Calculus based semester of Intro to Stats at the university level.

Term: All Year

Prerequisite: Completion of Algebra II with a grade of B or better and permission of the department.

### **Advanced Research/Topics in College Mathematics**

This course is the capstone experience for the serious student of mathematics as an academic discipline. Students bring their own interests in theoretical or applied mathematics to the table, and may opt to pursue independent research under the guidance of the Advanced Research course offered in the Science Department. The experience culminates with student seminars during which each member of the class presents a paper, which may be submitted for publication to an appropriate student journal. Topics

vary with student interest but are pursued with rigor and attention to current research in the field. Students may opt to take the course concurrently with *AP Stats* to gain a complete research based experience.

Term: Semester II

Prerequisite: Completion or enrollment in Calculus A or AP Stats and Permission of the department.

### **Foundations of Computer Science**

In this course students begin to use computational thinking as a problem-solving tool. They are introduced to programmatic thinking via online programming resources, including Java. In the second half of the course a study of a second type of language is undertaken (for example, Python) and students explore personal interests such as game design or, especially, Robotics. No experience with programming is required; though students with programming experience are accommodated with modified curriculum. Students will begin to appreciate the ubiquity of computing and the ways in which a deeper understanding of computer science facilitates communication, collaboration, and efficiency of system design. Students will appreciate computational thinking as a means of addressing issues that are relevant not just to them, but also to the world around them. Object oriented programming will be introduced and students will learn the significance of modular systems and the challenges and necessity of coding as a member of a team. The course is lab based, and will involve substantial practical experience with a variety of platforms.

Term: Semester I or II

Prerequisite: Algebra I

### **AP Computer Science Principles**

The AP Computer Science Principles course is designed to be equivalent to a first-semester introductory college computing course. In this course, students will develop computational thinking vital for success across all disciplines, such as using computational tools to analyze and study data and working with large data sets to analyze, visualize, and draw conclusions from trends. The course seeks to foster student creativity in the context of technology. Students are encouraged to apply creative processes when developing computational artifacts and to think creatively while using computer software and other technology to explore questions that interest them. They will also develop effective communication and collaboration skills, working independently and collaboratively to solve problems, and discussing and writing about the importance of these problems and the impacts to their community, society, and the world. The course is a continuation of Foundations of Computer Science, so students wishing to take AP CS Principles need to sign up to take Foundations of CS during semester I. Students are expected to take the AP Computer Science Principles Test at the end of the course.

Term: All Year

Prerequisite: Foundations of Computer Science with a score of B or better

## **AP Computer Science A**

The AP Computer Science A course is an introductory course in computer science, with JAVA as the primary language and vehicle for programming. The course is built around the development of understandable, adaptable, and, when appropriate, reusable computer programs that correctly solve a given problem. The design and implementation of computer programs is used as a context for introducing other important aspects of computer science, including the development and analysis of algorithms, the development and use of fundamental data structures, the study of standard algorithms and typical applications, and the use of logic and formal methods. In addition, the ethical and responsible use of these systems is an integral part of the course. The goals of the AP Computer Science A course are comparable to those in the introductory course for computer science majors offered in college and university computer science departments. The AP Computer Science A course is intended to serve both as an introductory course for potential computer science majors and as a course for people who will major in other disciplines that require significant involvement with technology. Students are expected to take the AP Exam in the spring.

Students are encouraged to use personal laptops in AP Computer Science A in order to facilitate homework, coursework and projects.

Term: All Year

Prerequisites: Algebra II, and Foundations of Computer Science or permission of the department

## ***Modern and Classical Languages***

### **Chinese**

#### **Chinese 6**

Chinese 6 (*Nihao I*) is designed to introduce the students to the Chinese language and culture. Through eleven distinct but interrelated topics of study, students obtain basic conversational skills (listening and speaking), reading and writing skills, as well as comprehensive views of Chinese culture. Topics include, but are not limited to: basic knowledge of China and the Chinese language, greetings, numbers, identification, personal belongings, family, pets, nationalities, sports, and friends. Chinese characters are often introduced via logical and semantic story-making method to help students “understand” rather than mechanically “memorize” the written Chinese. Pinyin system (romanization of Chinese) is also introduced to help students pronounce Chinese correctly. By the end of this course, students are expected to reach Novice Mid ACTFL proficiency level.

### **Chinese 7**

Chinese 7 (*Nihao 2*) expands upon sixth grade Chinese goals to teach students skills in the use of more advanced Chinese in a wider range of situations. Topics, such as birthdays, daily routines, house plans, clothing, shopping, making phone calls, food, and going to restaurants, reinforce students' previously learned knowledge, build new vocabulary, as well as increase students' conversational competence and cultural understanding and appreciation. By the end of this course, students are expected to reach Novice High ACTFL proficiency level.

### **Chinese 8**

Chinese 8 (*Nihao 3*) is the third level of the *Nihao* series. By the end of the course, students are able to use more sophisticated language to talk about weather, school life, and after-school life. They learn to express their opinions, comments, and concerns. Students can compose paragraph length of narratives and descriptions.

They are expected to reach Intermediate Low ACTFL proficiency level and placed to Chinese II in high school Chinese program.

Cultural learning is woven into the curriculum in such a way that students have opportunities to experience Chinese games, martial arts, calligraphy, painting, the Peking opera, as well as other elements of Chinese popular culture.

### **Chinese I**

This course serves as an introduction to Mandarin Chinese. Students develop basic listening, speaking, reading, and writing abilities, and develop understanding of the customs and life of modern China. In speaking, students develop accurate pronunciation and develop good communication skills in dialogues and be able to describe daily activities using a broad basic vocabulary. Students learn the structure and pattern of Chinese characters and are able to write short sentences. Culture is integrated into the curriculum, and includes elements of both modern and traditional life.

### **Chinese II**

This course is a continuation of Chinese I and focuses on building the students' command of oral and communicative structures in more sophisticated contexts. This course covers topics such as making appointments, school life, shopping, weather, transportation, writing a letter, among many others. Each theme is based on a communicative topic with specific objectives. Included in the content are contextualized vocabulary and grammar, listening, speaking, reading, and writing skills. Students are expected to become more proficient in both handwritten as well as word-processed Chinese writing. Many internet resources, podcasts, authentic Chinese articles, and a variety of communication activities are integral parts of each theme.

Cultural topics include Chinese calligraphy, painting, songs, acupuncture, holidays, Taijiquan, and Chinese film.

### **Chinese III**

This course is a continuation of Chinese II. The focus continues to be on oral proficiency, along with more grammatical patterns and characters. This course covers topics such as dining, visiting the library, seeing a doctor, going to a party, and dating, among many others. Students learn language through creating skits, role-playing, Chinese-style cooking, interviewing native speakers, as well as writing vocabulary and grammar tests. Internet resources, podcasts, and authentic Chinese materials provide a variety of ways for students to sharpen their reading, writing, listening, and typing skills. Students also watch movies or documentary clips that show the lives of ordinary Chinese in both mainland China and Taiwan.

At the end of Chinese III, students are encouraged to continue on in Chinese IV-A.P. or Chinese IV (non-A.P.), based on teacher recommendation.

### **Chinese IV**

This course builds upon the existing skills of students who have taken Chinese III. Students refine and expand their linguistic abilities. Areas of focus include basic and intermediate grammatical structures and orthography through reading, writing, speaking, and listening. Through a variety of media, students also explore culture, geography, history, and current events of the Chinese-speaking world. This class is taught exclusively in Chinese. Upon completion of this course, instructors recommend the appropriate subsequent level of Chinese study. This may be Chinese A.P. or regular Chinese V. Students exceeding the targeted level of language proficiency are encouraged to enroll in the A.P. Chinese language class.

### **Chinese V-A.P.**

The goal of this course is to deepen students' immersion into the language and culture of the Chinese-speaking world. The course engages students in an exploration of both contemporary and historical Chinese culture. Students learn about various aspects of contemporary Chinese society, including geography and population, ethnic and regional diversity, travel and transportation, climate and weather, holidays and food, sports, and current affairs. This class is taught exclusively in Chinese. This course, while preparing students to take the AP Chinese Language exam (students are encouraged to take AP exam, but not required), requires students to demonstrate their level of Chinese proficiency across the three communicative modes: interpersonal, interpretive, and presentational.

## **French**

### **French 6**

Throughout the year, we explore French language and culture through guided study in an interactive immersion class, the first in a three-year series. Students learn French through engaging in all four aspects of language learning every day: speaking, reading, writing, and listening. This introductory class develops the basics of communication in French through the use of specialized vocabulary units, culture lessons, skits and conversations,

news articles and podcasts, film, poetry, theatre, and songs. This course helps students acquire basic grammatical structures and understand the relationship between the sounds and spellings of French language through a variety of activities.

This course is aligned with the national standards for language learning (Communication, Cultures, Comparisons, Connections, and Community) and the Michigan World Languages Standards and Benchmarks. Students begin to communicate in French in oral and written forms through thoughtful introduction to authentic texts and real-life situational contexts.

### **French 7**

Middle School students continue their language-learning adventure in this next level of French. Drawing upon real-life situations, students prepare skits, act, sing, eat, draw, work in groups or with partners, perform listening comprehension exercises, while they are acquiring the foundations of the language. Each unit consists of a new vocabulary theme and grammar concept, reading and listening comprehension activities, speaking and writing activities, multimedia cultural presentations, and interactive activities and practices which reinforce vocabulary and grammar. There is a strong emphasis on providing context and conversational examples for the language concepts presented in each unit. Students should expect to be actively engaged in their own language learning, become familiar with common vocabulary terms and phrases, comprehend a wide range of grammar patterns, participate in simple conversations and respond appropriately to basic conversational prompts, analyze and compare cultural practices, products, and perspectives of various French-speaking countries, and take frequent assessments from which their language progress can be evaluated. By the end of the year, the students are able to function and communicate in many concrete situations.

### **French 8**

French 8 is the third and last year of French in Middle School, and students successfully completing the sequence may continue to French II in Upper School. The class focuses on communication. The extended goal is to develop verbal and written accuracy in increasingly complex sentences in the present, present progressive, near future, preterite/present perfect.

To this end, authentic materials (podcasts, on-line newspapers, videos), projects encouraging interpersonal communication, and organized debates are frequently employed. The students learn to retrieve and process specific information from French language resources to complete tasks and express acquired information in oral, visual, and written forms like creation of culture-related PowerPoint, skits, and brochures. In this way the students become progressively more familiar with the various cultures of the Francophone world within the context of the French language. One of the major projects is the building of French regional houses, which are the basis of architecture, real estate, advertising oral and written works.

## **French I**

This is an upper school course covering the same material as French 6, 7, and 8, which upon successful completion allows students to continue on to French II. The goal of French I is for students to acquire the basic tools of oral and written communication so that they can express their own ideas and communicate on a basic level should they travel to a French-speaking country. By the end of the year they have acquired sufficient vocabulary to enable them to describe people, things, and events using the present tense and one past tense, and the ability to use specific idiomatic expressions to express what they want to do, have to do, and what they will do.

Grammar and vocabulary are learned through communicative activities, often in-group settings, and the class is taught almost exclusively using the target language. Activities include skits with dialogue written by the students, singing, online recordings on cultural topics, conversations based on podcasts and video, and celebration of cultural events. The regional houses built by the eight graders are used to cover architectural and family-related vocabulary.

## **French II**

Throughout the year, we explore French language and culture through guided study in this interactive immersion class. Students learn French through all four aspects of language learning every day: speaking, reading, writing, and listening. This intermediate class includes new vocabulary, grammar and verb tenses, culture, skits and conversations, news, film, poetry, theatre, and songs. This course is aligned with the national standards for language learning (Communication, Cultures, Comparisons, Connections, and Community) and the Michigan World Languages Standards and Benchmarks.

The main goal of French II is to further develop communicative aspects of language and to work with more advanced grammar constructions to show sophistication in expression. Students become better at understanding and expressing themselves in French and gain more *savoir faire* in language use and cultural awareness through specialized vocabulary units, grammar and vocabulary assessments, game playing, learning poetry and songs by heart, writing and revising compositions, performing skits, and watching, discussing, and critiquing French films.

## **French III**

At this level students complete their study of basic and advanced grammar, except for the fine complex nuances that will be studied the following year in the Advanced Placement class. A variety of activities include spontaneous class discussions driven by student interests, music, films, a fashion project, French television commercials, and a lesson on Impressionism. The content of our lessons aims to motivate teenagers, but also to broaden the students' horizons by making them aware of social justice and issues of prejudice. Students also begin to study French literature with a play by Moliere.

At the end of French III, students are encouraged to continue on to French IV-AP or French IV (non-A.P.) based on teacher recommendation.

### **French IV Culture**

Throughout the year, we explore French language and culture through guided study of Francophone culture in this interactive immersion class. The theme for the year is “l’identité francophone”. Students continue to learn French through all four aspects of language learning every day: speaking, reading, writing, and listening. This advanced class includes presentations, skits and conversations, news, film, poetry, essays, fables, graphic novels, traditional modern and historical novels, and songs. This course is aligned with the national standards for language learning (Communication, Cultures, Comparisons, Connections, and Community) and the Michigan World Languages Standards and Benchmarks.

The main goal of French IV Culture is to develop appreciation for the richness of Francophone culture as seen through a variety of primary texts and authentic materials from various Francophone countries. Students also improve conversational skills, incorporate grammar study within the context of the material, and sharpen writing skills throughout the course of the year. Students gain sophistication in language use and cultural awareness through learning specialized vocabulary in context of cultural artifacts, decoding grammar from Francophone literature, writing and revising compositions, performing skits, and watching, discussing, and critiquing French films.

### **A.P. French Language and Culture**

This is a college-level course for upper school students. Structures necessary to communicate, both written and oral, are acquired and reinforced during the year, and are assessed on the A.P. Examination in May. In addition, this course fosters and enhances knowledge and comprehension of Francophone cultures through six themes structuring the curriculum *Global Challenges, Science and Technology, Contemporary Life, Personal and Public Identities, Family and Communities, Beauty and Aesthetics*. These themes furnish a frame of reference allowing students to practice interpersonal, interpretive and presentational communicative skills including two-way interactions in both writing and speaking (email responses, role play-dialogues, interpretation of audio, audiovisual, and print materials, short and extensive oral and written presentation of information and ideas).

Collaboration with classmates is an essential part of class life: technical French – grammar, syntax, vocabulary, conjugation – is mainly studied in group settings; explanations given to each other are exclusively in French.

### **French V Advanced Literature**

This course is a college-level survey course taught exclusively in French. It is offered every year and is designed for the most advanced French students coming from the A.P. class who love literature. The course program is challenging, as all texts are read in the original French and can be, in light of the time when they were written, difficult to

decode. In addition to reading, analyzing, and discussing classic and modern literature, students also learn how to write on the French model formal text analysis, which means exploring another approach to texts, the method implying an objective and exhaustive examination of the structure, imagery and style.

As for essays, three different approaches are to be used:

- didactic outline (thesis, antithesis, synthesis/overtaking)
- analytic outline (situation description or explanation, cause analysis or illustration, consequence analysis and commentary)
- thematic outline ( reflecting on one or several notions while answering the topic question in a well ordered mannered argumentation)

The reading of the following texts is mandatory:

Plays and Novels: Maupassant: *Pierre et Jean* (19th Century), Voltaire: *Candide* (18th Century), Corneille, *Le Cid* (17th Century), Patrick Chamoiseau: *Une Enfance créole II* (20th Century), Sartre: *Huis-Clos* (20<sup>th</sup> century) Monique Proulx: *Les Aurores montréalaises* (20th Century); Poetry: Du Bellay (16th Century), Louise Labé (16th Century), La Fontaine (17th Century), Baudelaire (19th Century), Apollinaire ( 19th/20th Century).

## **French V Culture**

This course focuses on two major cultural topics of French culture: cinema and pop music. Language acquisition is no longer the focus even though we still manage to make adjustments when the errors get in the way of comprehension both in verbal and written work. The first semester concentrates on the history of French cinema from 1895 to the present. One unit also focuses on techniques of cinema. Throughout the semester students are exposed to and work with films from the early silent period to the more modern cerebral, sociological, and psychologically oriented one. While the main goal for students is to deepen their understanding and appreciation of French culture, they also gain a broader and deeper notion of what cinema is as an art. The second semester focuses on ‘La scène musicale française,’ with an emphasis on popular music. The whole movement of *La Chanson Française* is studied thoroughly, and class topics include French rock, punk, and rap, as well. The students will learn to decode, analyze, appreciate films and songs with a critical eye rather than focusing on the entertaining part of it.

## **Latin**

### **Middle School**

#### **Latin 6, 7 and 8**

This beginning sequence of Latin courses for middle-school students covers the basic structures of the language exclusive of the subjunctive. Emphasis is placed on Latin as a means of communication and on reading skills. The primary texts (Volumes 1 and 2 of the *Oxford Latin Course*) make clear many details of daily life among the ancient

Romans. Activities may include songs, skits, games, puzzles, work with Latin roots, and introduction to Greek and Roman mythology. By the end of this three-year sequence, students are able to read Latin stories written in all six verb tenses. Reading comprehension of Latin stories is also stressed. Students, confronting new texts in Latin, can reply in both Latin and English to questions posed, in both Latin and English, about the stories.

## **Upper School**

### **Latin I**

In this beginning course, students learn the basic structures and vocabulary of the language which the ancient Romans spoke; as a result, students begin to appreciate the structures of their own language and to see the dramatic influence Latin has had on the English language.

The main goal of the course is to help students learn to read Latin; writing, speaking and listening in Latin is used. The primary textbook, *Jenney's First Year Latin* (1987) is frequently supplemented by resources from a variety of other textbooks, on-line resources, and mythology handbooks. By the end of the year, students have a strong foundation in the Latin language. The course also provides some historical and cultural background to give students a context for the stories they read. *Inter alia*, students learn about Roman houses, food, architecture, entertainment, clothing and religion, as well as the quasi-mythical stories of Rome's foundation, regal period, and early Republic.

### **Latin II**

Students greatly expand their Latin vocabulary; knowledge of grammar increases to include common uses of the subjunctive, infinitives, participles, and all uses of noun cases. A comprehensive workbook (*Review and Test Preparation Guide for the Intermediate Latin Student*) expands upon the grammar and exercises found in the textbook, *Jenney's Second Year Latin* (1987), which presents Latin versions of the Hercules, Perseus, and Jason and the Argonauts stories, and other myths and historical texts are read as sight-reading exercises. Selections of inscriptions, graffiti, and mediaeval authors may also be read.

By the end of this course students know all of basic Latin grammar and are poised to read unadapted selections of various Roman authors, both prose and poetry, as well as inscriptions and the common abbreviations used in them. Students continue their survey of Roman and Greek culture.

### **Latin III**

Students read selections from Sallust's *Bellum Catilinae*, followed by a close reading of Cicero's *In Catilinam*. The study of the Latin texts is supplemented by readings of other relevant texts in English translation.

Much emphasis is placed on solidifying grammar and syntax to prepare the student for all future Latin study. Life in the late Republic and details of the fall of the Roman Republic, within the background of Roman history, is also a constant focus. Other primary sources, such as tomb inscriptions, poems, and extant letters are investigated as supplements.

At the end of Latin III, students are encouraged to continue on to Latin IV-AP or Latin IV (non-A.P.) based on teacher recommendation.

#### **Latin IV/V**

Students read from a variety of authors who reflect the death of the Roman Republic and the birth of the Empire, with a focus on Augustan Rome. In alternating years, we spend most of that year's course reading poetry or prose works, so that, should a student take the course two consecutive years, they will experience two different syllabi. Current syllabi alternate between Catullus and Ovid one year, and Roman historians the other.

Latin III and Latin instructor's permission are required to register for this class.

#### **Latin IV/V-A.P.**

Students read Latin selections as well as larger swaths of text in translation from Caesar's *Bellum Gallicum* and Vergil's *Aeneid*, as outlined by the A.P. program in preparation for the national exam in May.

The A.P. course is designed to sharpen students' skills in all sorts of ways, and thus daily class format includes more than reciting and sharing translations of whole chapters or parts of longer ones of Caesar's work and lines of verse from Vergil (anywhere from 10 to 30 lines of poetry a night, depending on difficulty and class schedule). Students do occasional extra readings in order to help them think carefully about what they have translated and, when needed, they engage in extra outside practice sessions for honing their technical skills (memorization of declensions, conjugations, forms, and syntax).

Among the goals of this course is to learn how to render a precise, literal but elegant English translation. Attention to details of grammar (verb tenses, noun cases and numbers, etc.) is essential. Often class time is used to continue reading the Latin "at sight."

Based on these translations students engage in thoughtful and productive discussions of the themes addressed in Caesar and Vergil as well as the audience, overall purpose and intent, plot, imagery, similes, political and social implications, ethnography, mythology and philosophy embedded in the texts. Scholarly articles on select topics may be assigned in order to broaden understanding of Caesarian and Vergilian studies and to develop the ability to distill the information found within and to report it succinctly and effectively to the class.

Tests of various formats (multiple choice, translation, short answer, essay, scansion) will be intermittent; more frequent will be small, brief quizzes on translation, vocabulary, meter, and rhetorical devices given at the beginning of class, often unannounced.

Students are required to sit for the A.P. examination in May.

Latin III and Latin instructor's permission are required to register for this class.

### **Classical Epic**

*Classics Elective:* This class may not be used to fulfill the language requirement.

This semester course presents a thorough study of the classical epic, including the *Iliad*, *Odyssey*, *Theogony*, and *Aeneid*. In addition, selections from the *Argonautica*, *De Rerum Natura*, and the *Metamorphoses* may be assigned.

Students gain familiarity with the works of the ancient authors through lectures and discussion. Additionally, the course explores the various representations of these works in other media. Students prepare projects and papers on selected topics for class presentations.

Term: Semester I

### **Classical Drama**

*Classics Elective:* This class may not be used to fulfill the language requirement.

This semester course presents an introduction to classical Greek drama, both tragedy and comedy, through the study of the works of Aeschylus, Sophocles, Euripides and Aristophanes. Plays of each author will be studied, discussed, and used as starting points for student research on various topics, such as the staging of classical drama, the archaeology of the ancient theater, religion and drama, New Comedy, and Roman drama.

Term: Semester II

### **Classical Greek I**

This will serve as an introduction to the study of ancient Greek, as written and spoken from the 8th century BCE on, with a concentration on the Attic dialect of the 5th and 4th centuries *Note: if continued through level II, would fulfill language requirement*

### **Spanish**

In middle school Spanish classes, students develop an appreciation for Spanish language and culture. The full sequence of study is a challenging and fun opportunity for students to make great strides in just three short years. Students learn quickly to communicate in Spanish in an immersion classroom. By the end of 8th grade, they are comfortable speaking, understanding, reading and writing in the present and immediate future tenses. Students work with authentic materials and learn vocabulary and grammar via the study

of cultural themes, such as dance, music, food, holidays, clothing, art, education, history, and traditions. With practice, students are able to pronounce new words and deduce their meaning by using context. There are many opportunities for students to speak and write about themselves, including their hobbies, likes, dislikes, opinions, family, and friends. Students are also able to read short books and other selections for comprehension. Student learning is not limited to the classroom, but rather extends to interdisciplinary work with other classes (Math, Art, Civics, English, Science) and into the greater community. Students take their knowledge and expand upon it when dining at local Hispanic restaurants or in Mexican Town in Detroit, listening to live, local performances, attending DIA trips to study Diego Rivera, and have an opportunity for travel to Costa Rica on summer trips and bringing a donation of school supplies to the Maleku Indians, creating various opportunities for service both locally and beyond. In recent years students have decorated sugar skulls for a local Mexican restaurant's *ofrenda*, and have visited Ypsilanti Public Schools to read original stories to Hispanic children.

Students are assessed in a variety of ways throughout their three years of Spanish instruction, such as traditional quizzes and tests, songs, games, drawings, TPR, skits, puppet shows, preparing and sampling new authentic foods, Cloze listening activities, written and oral projects, essays, fashion shows, presentations, weather reports, and original fairy tales. ¡Pura vida!

### **Spanish 6**

The Spanish 6 course is designed to establish a solid foundation from which students build upon for years to come. Most importantly, this is a year that marks the beginning of a strong appreciation of Spanish language and culture for future study. Students learn Spanish within an immersion setting via songs, games, projects, skits, presentations, videos, art, field trips, and traditional assessments. By the end of the year, students are able to read, write, speak and understand a basic level of Spanish, with extra emphasis on describing their own lives. Students learn correct pronunciation, a large vocabulary base, and verb conjugation in the simple present tense. They also learn agreement in gender and number. Students who are motivated have many opportunities to practice and build upon their Spanish knowledge. Culture and grammar are woven in throughout the year, so that students can better understand and appreciate the richness of the Spanish-speaking world.

### **Spanish 7**

Students continue to grow and expand their horizons in an immersion setting. The seventh-grade year is a key one for actively putting sentences together orally and for concentrating on the production of writing. Spanish students, as all seventh graders, focus on study skills, organization, note taking, and the process of self-correction in writing. Knowledge of the present tense is expanded, introducing many more irregular verbs. All vocabulary and grammar topics that were introduced in 6th grade are reviewed and expanded via projects, presentations, dialogues, games, drawing, acting, and traditional testing. Among the important projects that occur in seventh grade are decorating sugar skulls for a local Mexican restaurant's *ofrenda*, presenting to the class about a favorite

New Year's tradition, describing oneself and one's likes, by designing a name-based acrostic project, preparing a handmade photo album that describes the members of one's family, their likes and dislikes, and their favorite traditions.

During XYZ day classes, the Spanish 7 classroom turns into a lab where cultural explorations involving food allow students to explore diverse foods and traditions from the Hispanic and Latino world. These food tastings enable us to travel all over the Spanish-speaking world and to sample the best and most interesting foods, while celebrating different traditions and learning about culture. In this way, vocabulary, verbs, and grammar structures are introduced in a very authentic way. We are able to celebrate Chilean Independence Day, Day of the Dead, Three Kings Day, sample cookies and beverages from all over the Spanish-speaking world, as well as tapas, and many candies and typical snacks.

### **Spanish 8**

The Spanish 8 course builds upon all of the progress students have made in Spanish 6 and Spanish 7. After completing this course, students are ready to enter Spanish II the following year in Upper School. Reading, writing, speaking and listening in the simple present, present progressive, and simple future tenses are practiced and assessed in detail. Now in their third consecutive year of middle school Spanish studies, students are even more comfortable with the immersion setting. It is common for students to create skits and role-play in the classroom in order to approximate authentic experiences. Students further enhance their knowledge and appreciation of Spanish by studying authentic texts and songs, always focusing on grammar, pronunciation, vocabulary, and culture. Circumlocution skills are developed as students push themselves to understand and describe new vocabulary. The Art, English, and Spanish interdisciplinary unit, "Las fallas," consistently ranks as students' favorite unit of the year. After numerous communicative activities, written projects, games and traditional assessments, students finish the school year by visiting Spanish-speaking children in either Ypsilanti or Detroit. This is the perfect opportunity for students to use their Spanish knowledge and skills to converse and connect with native speakers. Such visits often offer the opportunity to combine a visit to one of the many Hispanic restaurants or stores in our area. In addition, every year, there is an opportunity to connect with Spanish-speakers in our immediate community in Ann Arbor/Ypsilanti or in Detroit. Our students challenge themselves by pairing up with buddies and using their Spanish.

### **Spanish I**

This is an upper school course that covers essentially the same material as Spanish 6, 7, and 8, allowing the student who satisfactorily completes the course to continue on to Spanish II.

Students acquire the basic tools for effective oral and written communication so that they can express their own ideas and communicate on a basic level. By the end of the year, they can describe people, places, events, and things in the simple present tense. They can also use specific idiomatic constructions to talk about what they and others have to do,

want to do, and will do in the future. The class is taught almost exclusively in Spanish in order to develop the students' aural comprehension and speaking skills. Students acquire vocabulary, grammatical structures and functions, and, most importantly, confidence in their abilities by participating in communicative, contextualized activities. Emphasis is placed on the richness and diversity of culture and traditions within the Spanish-speaking world. Activities include speaking in pairs and small groups, working on projects, writing dialogues, playing games, singing, celebrating cultural events, studying artists, and reading authentic passages.

## **Spanish II**

Students continue to expand the frontiers of their reading and aural comprehension and written and oral expression in an immersion classroom, using a wide diversity of class discussions, activities, and assessments in a supportive atmosphere that encourages participation and involvement.

The Spanish II experience is based on adding many new, functional vocabulary and grammar items, as well as making significant progress in speaking and writing. The verb tenses learned in Spanish I--the present, present progressive, and immediate future-- are reviewed and built upon. In addition, students learn the preterit, simple future, imperfect, past progressive, and present perfect. Watching Spanish movies, commercials, and short YouTube selections, interviewing friends and reporting to the class, taking grammar and vocabulary tests, correcting all tests and homework assignments, writing and revising short compositions, singing, playing games, working on small and large projects, mastering vocabulary and structures by preparing and practicing Quizlet and Study Stack activities, reading short selections related to history and culture, and taking good notes are all part of the Level II experience.

Students watch one or two feature length films during the year. Through discussions and activities based on these films, students learn new grammar structures and expand their vocabulary base and speaking skills. These films also allow students to delve more deeply into Spanish history, culture, and issues of social justice.

During extended XYZ-day classes, the Spanish II classroom turns into a lab where cultural explorations involving food allow students to experience diverse foods and traditions from the Hispanic and Latino world. These food-tastings enable students to travel all over the Spanish-speaking world, as it were, and to sample the best and most interesting foods, while celebrating different traditions and learning about culture. In this way, vocabulary, verbs, and grammar structures are introduced in a very authentic way. During Semester 2, students visit Spanish-speaking ESL four- and five-year-olds at Perry Development Center in Ypsilanti to read the story books they wrote in Semester 1, converse in Spanish, play, and bring a donation of children's books in English to the school. This visit is usually combined with an authentic Hispanic lunch, available at the growing number of authentic Mexican restaurants in town. Students may also visit Hispanic grocery stores in town and sample products from them. By working together in pairs and in groups, our students acquire a higher level of accuracy and creativity and

further develop their communication skills. Upon completion of Spanish II, students may advance to Spanish III.

### **Spanish III**

Spanish III is a challenging course in which all previous language topics are reviewed and all remaining elements of grammar are presented, with specific focus on past tense narration and the acquisition of the subjunctive, conditional, and imperative moods. There is also great emphasis on vocabulary development, suffix and prefix relationships, and reading and writing strategies. In language, one learns by doing.

Students learn to speak well by speaking, and to listen well by listening. Current events, history, language, culture, last night's dinner or episode of *The Walking Dead* all become topics for basic communication. When students make the effort to participate actively they improve their vocabulary, pronunciation, fluency, and self-confidence. All manner of dialogue, questions, and comments is welcome. As communication involves both individuals who speak and individuals who listen to those who are speaking, active listening is an essential component of second language acquisition. Speaking up is encouraged, as is listening attentively to others.

Students learn to read by reading. For homework assignments and in class, magazine and web articles, advertisements, short stories, poems, song lyrics, and other things of interest discovered along the way are read. The development of good reading strategies is a primary focus of the class.

Students learn to write by writing, both formally and informally, both in-class and at home. Students write frequently. Some writing is collected and graded for grammatical accuracy; much writing is not. Learning to express oneself well in writing can be a joy, and learning to do it in Spanish doubly so.

Students expand their vocabulary exponentially, learning to express themselves far more accurately and in much greater detail than ever before. Being able to say exactly what is meant in any language is a wonderful thing, and appreciating that there are many different ways to get the same point across is another. Students work on both throughout the year, with a part of each class period devoted specifically to vocabulary development and expansion.

### **Spanish IV**

What comes to mind when you initially think about Spain? Is it only soccer, beaches, bulls, and flamenco dancers, or is there more? This class looks at Spain through a variety of lenses so that students will develop a deep understanding of its history, peoples, and culture. Students acquire a rich, varied vocabulary and further develop their skills in understanding, speaking, reading, and writing Spanish through reading and discussing authentic texts (a textbook written in Spanish, articles, short stories, poetry, web pages, speeches, and a full-length play) and researching topics for a variety of projects. Spanish is used daily in class discussions and activities and students are encouraged to focus their

efforts on creatively “learning by doing” in all aspects of language use. At the end of the year, students present culminating projects that encompass a wide variety of cultural and historical themes. Throughout the year, grammar topics will be reviewed as needed, and students will receive individual feedback on their writing. Periodic vocabulary tests are also individualized, encouraging students to take personal ownership of their language acquisition. The class is organized into the following units: Geography and Culture, Essential History of Spain, 20th Century Spain, and Spain and its Traditions.

### **Spanish A.P.**

This advanced course requires much effort and can deliver valuable dividends. Students review, refine, and expand their language skills and cultural knowledge through reading articles and listening to interviews and radio programs culled from the Spanish language press in both Spain and Latin America. Literary selections from throughout the Spanish-speaking world are also studied. Students participate in substantive discussions, working towards using a precise and sophisticated level of discourse in Spanish. They acquire a rich, varied vocabulary and finely hone their skills in understanding, speaking, reading, and writing Spanish. Students also specifically practice for the A.P. Spanish Language and Culture exam using A.P. language texts, and have access to the books’ websites, which are replete with extra exercises and resources (including a personal vocabulary tracker). Students use Spanish daily in class discussions and activities, do written and oral practice exercises, write essays, find and share articles from the on-line press, and make frequent oral presentations. Throughout the year, grammar topics are reviewed in context, and students receive individual feedback on their writing. Regular vocabulary tests are also individualized, encouraging students to take personal ownership of their language acquisition. At the end of the year, after the A.P. exam, students present culminating projects on a wide variety of cultural and historical themes.

### **Spanish V**

*Bienvenidos a Spanish V!* The icon on this class' Greenhouse page is a big pile of books, for a good reason: in Spanish V, students live in the World of Text (not all of it written). Literary selections do comprise the primary basis of units in Spanish V. Among these are short stories, poems, and excerpts of novels in a multiplicity of genres written by major 20th-century authors of the Spanish-speaking world. Julio Cortázar, Jorge Luis Borges, Federico García-Lorca, Isaac Eisemberg, Horacio Quiroga, Laura Esquivel, Luisa Valenzuela, Gabriel García-Marquez, Nicolás Guillén, and others are read. Also considered are films (narrative and documentary) and specific works of art. These are all texts, and are studied critically with regard to both creative and cultural context.

Students write *resúmenes* and *respuestas* to what is read, watched, and seen, give personal oral presentations on related topics, and, of course, discuss them with one another. They also delve into culturally specific topics as they relate to specific texts. As always, ongoing vocabulary development is an essential aspect of the course.

As students read and watch their way around Spain and Latin America, they also take turns preparing food from the authors' countries of origin, meaning they sample not only Spanish cuisine, but also Argentinian, Mexican, Cuban, Colombian, and more!

This is a *flexible course*. If there is an author, topic, region, or genre that students would particularly like to consider, it can certainly be incorporated.

## *Science*

### **MIDDLE SCHOOL**

The Middle School science program is designed to facilitate students' understanding of fundamental science concepts and scientific practices through the process of inquiry, and to empower students to view themselves as global citizens who have responsibility to take positive action to contribute to a sustainable earth. Our classroom environments reflect the practices of expert scientists, in particular by using inquiry through collaboration. Students answer meaningful questions that investigate phenomena, enabling them to develop an understanding of the natural world in which they live. We work to create a student-centered classroom culture in which students are encouraged to take risks in their collaboration, including the critiquing of each other's work and ideas. As a result, our students become more thoughtful about their own work and more respectful and supportive of their peers. During the process of inquiry, students ask and refine questions; find, incorporate and use information; design experiments; collect and organize data; create graphs and protocols for data interpretation; and apply results to create scientific arguments and explanations to defend conclusions.

During each year of study in Middle School science, students investigate a variety of science disciplines, including physics, chemistry, biology, earth science and environmental science. As students develop and carry out their investigations, they discover that many phenomena are most fully investigated by integrating key concepts from several science disciplines.

Various technology tools that promote learning are embedded throughout the Middle School science curriculum and serve as essential components of the work. Students use these tools to gather and synthesize information; collect and interpret data; model various phenomena; engage with interactive multimedia; and create presentations for their classmates.

The approach adopted by the Greenhills Middle School science faculty aligns with the National Science Education Standards (1996), with the American Association for the Advancement of Science benchmarks (1993) and with the New Framework for Science Education (2011). The program was selected for inclusion in the 2005 National Science Teachers Association Press publication Exemplary Science in Grades 5-8: Standards

Based Success Stories, part of a Monograph Series highlighting programs throughout the U.S. that exemplify the national science standards.

## Science 6

IQWST units are designed to align with national content and inquiry standards from the American Association for the Advancement of Science (AAAS, 1993) and the National Research Council (NRC, 2011). The Greenhills 6<sup>th</sup> grade curriculum will include three units—one each in physics, chemistry and biology.

Using an activity-based, rather than a textbook-based curriculum, the student edition functions more like a portfolio, with in-class activity sheets, readings, and other homework assignments assembled in one binder. Focal scientific practices include designing investigations; data gathering, organization, and analysis; modeling of scientific phenomena; constructing evidence-based explanations; and opportunities to develop literacy in science through extensive reading and writing.

Greenhills students will focus on knowing science more than memorizing content. Knowing science means developing scientific practices through inquiry—a view consistent with current science education reform efforts. The NRC stresses the importance of addressing content and inquiry standards simultaneously because “student understanding of inquiry does not, and cannot, develop in isolation from science subject matter” (2001, p. 36).

### Unit 1: Light, its role in sight, and its interaction with

See the Light: Can I Believe My Eyes? is a 8-week, project-based unit. The unit focuses on making sense of an anchoring activity, which we call the “hidden message” activity: A message, or parts of it, appear and disappear depending on the color of light used to illuminate the message. The driving question for the unit is: Seeing the light: Can I believe my eyes? The target science ideas and inquiry processes are instrumental to understanding the anchoring activity and answering the driving question. Students complete several investigations, each time cycling back to the anchoring activity. Each cycle helps them delve into the science content to gain a deeper understanding of how light moves through space, what happens when it meets matter, how our eyes detect light, and how colors of light can be perceived to be different than what they really are. Throughout the unit, a model of light and seeing is developed, applied to explain new phenomena, critiqued, modified, and re-applied.

### Unit 2: Particle nature of matter and phase changes

This 8-week, project-based unit helps students develop an understanding of the particle nature of matter through experiencing and explaining a variety of phenomena. In order to contextualize chemistry concepts and scientific inquiry in students’ everyday experiences, the unit focuses on the phenomenon of how they smell odors. The driving question, “**How can I smell things from a distance?**” organizes and motivates activities throughout the unit. Students complete a number of investigations, each time revisiting the application to smelling odors. Each cycle helps them delve deeper into the science

content to understand the particle nature of matter. The unit focuses on the scientific practice of modeling. Students construct and frequently revise their model of matter, which is represented both as a drawing and a written explanation of their drawing. The teacher facilitates discussions to help students revisit ideas about models and modeling that were introduced in the physics unit.

### Unit 3: Survival: From organisms to ecosystems

**“Where have all the creatures gone?”** is the title of the biology unit. This ecosystem unit focuses on organisms’ needs for survival and what happens when those needs are not met. It is organized around the driving question: “What can cause populations to change?” This question is addressed through the investigation of a specific population change: students examine why the trout population in the Great Lakes decreased significantly from 1930 to 1990. Over the course of this investigation, students learn why food is important, what structures different organisms have in order to eat and reproduce, what the different relationships are between organisms (e.g. predator/prey, producer/consumer and competition) and what abiotic factors affect ecosystems. All of these pieces combine to help students construct an evidence-based scientific explanation about why the trout population has decreased so drastically.

Term: All Year

Prerequisite: None

### **Science 7**

The 7th grade science program at Greenhills engages students in developing understanding of key scientific ideas and principles through investigating phenomena in order to experience, first hand, the richness and excitement of developing deep understanding of the natural world in which they live. One goal of the curriculum is to empower students to view themselves as global citizens who have responsibility to take positive action to contribute to a sustainable earth. Three projects comprise the curriculum whose goal is to address the learning outcomes envisioned by the National Research Council’s *Framework for K-12 Science Education* and further articulated through the Next Generation of Science Standards (NGSS). Our curriculum systematically builds to help students develop understanding. Our pedagogical approach focuses on integrating scientific and engineering practices, crosscutting concepts, and core ideas of science termed 3-Dimensional Learning, also called upon by the *Framework*.

*“How healthy is the stream for freshwater water organisms? How do our actions outside on land impact the stream?”* This project focuses on earth science, biology, chemistry, and environmental science concepts. Using sensors attached to portable technology tools students collect pH, temperature, conductivity, dissolved oxygen, and turbidity data at the stream on Greenhills’ property. They also collect a variety of qualitative data. Students then systematically analyze these data to look for patterns and trends to determine the quality of the stream for supporting life. They also look at how their actions outside in the mini-watershed can adversely affect the quality of the stream. Students use this real-time data as evidence to create a scientific explanation that they revise as more data is collected. Students also create models of the water quality of the stream. The project culminates with an interdisciplinary public speaking unit where students

connect their science learning with the local community as they share their knowledge through formal presentations.

*"How do you make new stuff from old stuff?"* focuses on chemistry concepts including properties of matter such as density, solubility and melting point, the nature of chemical reactions including macroscopic and particulate nature of matter, and the conservation of mass. The curriculum is presented as a series of experiments and activities that build on each other to promote students developing rich understanding of chemistry concepts. The project's focus is on having students developing explanations and models of chemical phenomena.

*"Why is it so difficult to predict Michigan's weather?"* focuses on predicting the weather. Students explore weather by designing and building a wind vane, keeping daily weather records by collecting various weather data using probes and other tools, as well as recording other observations. We explore air masses and how they interact to cause weather changes. All the experiences should help students to forecast the weather and better understand why it is so challenging.

All three projects reflect classroom cultures where students collaborate and routinely use scientific and engineering practices in order to explain phenomena as they investigate these authentic questions that relate to their daily lives. Students engage in the following scientific practices: asking and refining questions: finding, incorporating and using information: designing experiments; collecting and organizing data: creating graphs and protocols for data interpretation; and applying the results to create scientific arguments and explanations to defend conclusions. New learning technology tools are embedded throughout the curriculum and serve as essential components of the work. These include tools for gathering and synthesizing information, collecting and interpreting data, modeling, and viewing multimedia and presentation software.

Term: All Year

Prerequisite: None

## **Science 8**

Throughout the 8th grade, students collaborate and routinely use scientific practices in order to explain phenomena as they find solutions to authentic questions. Students engage in the following scientific practices: asking and refining questions; finding, incorporating and using information; designing experiments; collecting and organizing data; creating graphs and protocols for data interpretation; and applying the results to create scientific arguments and explanations to defend conclusions. New learning technology tools are embedded throughout the curriculum and serve as essential components of the work. These include tools for gathering and synthesizing information, collecting and interpreting data, modeling, and multimedia and presentation software. One goal of the curriculum is to empower students to view themselves as global citizens who have responsibility to take positive action to contribute to a sustainable earth. Our curriculum systematically builds to help students develop understanding. Our pedagogical approach focuses on integrating scientific and engineering practices, crosscutting concepts, and core ideas of science termed 3-Dimensional Learning, also called upon by the new *Framework*.

The 8th grade curriculum has several units that center on the theme of energy. The first unit begins our exploration of the topic of energy. The driving question *"Why Do Some Things Stop While Others Keep Going?"* focuses on the idea that all of what goes on in the universe involves

some form of energy transformation. Students explore how energy gets converted from one type to another, why energy seems to get “used up”, how living things use energy, what sources of energy are available and the different ways of producing energy. Students demonstrate their understanding of these concepts as they design and build a Rube Goldberg machine.

The second unit, "*How Does Food Provide My Body With Energy?*" is a cross-disciplinary unit targeting chemistry ideas in the context of living systems. This unit’s goal is to create personal relevance and motivation for learning the content, which focuses on the nature of food, how we use food in our cells (respiration), and how plants make food (photosynthesis). As a culminating activity, students design and conduct various investigations branching from the unit that include researched background information, design of procedures and data collection protocols and where data collection includes experiments, questionnaires, and taste-tests (where applicable). This data will be analyzed and the entire investigation will be formally presented to the class.

In the final unit, energy is revisited by investigating alternative methods to produce energy to reduce our dependency on oil. Through teacher and student designed investigations, students learn firsthand about the difference between continuous and intermittent alternative energy sources by collecting and analyzing data collected from Greenhills’ solar, geothermal and wind turbine energy systems. Students apply their understanding by engaging in activities in which they propose energy plans for remote and populated areas of the country based on available resources. Students further explore Alternative Energy resources by designing and building a wind turbine, an Alternative Energy machine, vehicle, or a 3-dimensional building with working parallel and series circuits (powered by solar or wind energy).

Concurrent to our Science curriculum running throughout the year, all 8<sup>th</sup> grade students develop a “Sustainability Action Project” (SAP). As students explore and learn to appreciate the complexities surrounding energy, it is also important that students understand the sustainability issues connected to energy. Students will address the tenants of “Sustainability” (Environment, Social Justice, Economic and Peace) as they explore their topics of choice.

The SAP project gives students the opportunity to understand and investigate a community issue of their choosing that recognizes global importance. Students channel their findings into a real action project aimed at taking a stand and proposing a change in the world. While exploring sustainability issues, students use the scientific skills they have developed to investigate the world beyond their immediate environment. By engaging in conversations with students from other schools in the US and abroad, it is our hope that students continue to develop their talents as global citizens to recognize their own and others perspectives on issues surrounding sustainability. They accomplish this goal by translating their findings into appropriate actions to improve the world locally and understand how that small change impacts the world globally. This project will culminate in an evening where students will present their projects to the local community members and leaders.

Prerequisite: None

Term: All Year

## **UPPER SCHOOL**

Science is ever expanding; each day new ideas and data accumulate. Pick up any newspaper and there will be information on human cloning, deforestation, global

warming, nuclear power, medical breakthroughs, extreme weather, and the like. How are students going to deal with this (often technical) array of information? To learn every relevant detail is impossible. However, a working understanding is attainable, both of the unifying concepts, and of the scientific practices by which scientists learn and discover. This working understanding is at the heart of the Science Department's goals at Greenhills. Exposure to a diverse curriculum that uses current technology such as DNA separating gels and computer probes allows students to develop an understanding of how science "works". By adding to these skills of research both a working knowledge of key concepts and an environment of critical thinking, there emerges an experience that enables students to take on new ideas effectively.

Our basic goals are to:

- 1) Foster an appreciation of science and related information and concepts so that students will be able to enjoy science in the future.
- 2) Equip students with the knowledge and skills for college level work, and so that they would be able to make informed decisions in our increasingly technological world.

Although all students are required to take three full credit science courses, with at least one in life science (biology) and one in a physical science (physics or chemistry), we recommend that all students take a course in each of the three science content areas. (Having a three-discipline background is sometimes a factor in determining who can take a particular advanced course when enrollment is tight.) In fact, the average number of science courses among our graduating seniors is a little over five. Students thinking about a career in either the pure or the applied sciences (such as engineering, medicine, dentistry, or veterinary medicine) are strongly encouraged to take courses in biology, chemistry, and physics, as well as at least one advanced course.

Starting in tenth grade, science courses do not have to follow a specific sequence. Accordingly, if you have particular questions about choices or sequences for your son or daughter, please feel free to contact a member of the Science Department for clarification. A few of these possible sequences are described below.

## Various Science Course Sequences

While several courses do have prerequisites, many science courses do not have to follow one another in a particular order. Once a student selects a tenth grade course, numerous sequences are possible. Accordingly, if you have particular questions about choices or sequences for your son or daughter, please feel free to contact a member of the Science Department for clarification. A few of these possible sequences are described below.

### Grade 9

### Grade 10

### Grade 11

### Grade 12

#### **Possible Science Course Selections for various grades:**

Intro. Biology	Chemistry (or 11, 12)	Physics (or 12)	Adv. Sciences
Appl. Engineering	Chemistry Honors (or 11, 12)	Physics Honors (or 12)	Adv. Calc. Physics
	Conceptual Physics (or 11,12)	Adv. Chemistry (or 12)	Advanced Research
	Natural History (or 12)	Adv. Biology (or 12)	Ecol. and Global Sustain.
	ESSU (or 11, 12)	Appl. Engineering	Appl. Engineering

#### **A possible set of courses for students interested in pure or applied science in college:**

Intro. Biology	Chemistry Honors	Physics Honors	Choice of Adv. courses Advanced Research
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#### **A possible set of courses for students who want a basic college preparatory science curriculum:**

Intro. Biology	Chemistry	Physics	ESSU Anat. & Physio.
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#### **Possible set of courses for students who want as much science and challenge as they can get:**

Intro. Biology	Chemistry Honors	Physics Honors	Adv. Calc Phys.
	Natural History	Advanced Biology or	Adv. Chemistry
	Anat. & Physio.	Advanced Research	Ecol. and Global Sustain.

#### **A possible set of courses for students especially interested in physical sciences:**

Intro. Biology	Honors Chemistry	Honors Physics	Adv. Calc Phys.
	ESSU	Adv. Chemistry	Adv. Chemistry
			Advanced Research

These are only a few of the many sequences of courses possible. Some basic expectations include that Introductory Biology precedes other coursework; that a Chemistry course precedes Advanced Biology, Advanced Chemistry and Anatomy and Physiology; that most of our graduates will take at least a Biology, Chemistry and

Physics class; and that there are specific math skills needed for Honors Physics, Advanced Chemistry and Advanced Calculus-Based Physics. For other requirements and prerequisites, carefully read the course descriptions.

### **Introductory Biology**

This course is an introduction to the study of living things, emphasizing both their unifying characteristics and those factors contributing to their diversity. Key topics include the nature of science, ecology, an introduction to the basic principles of chemistry and biochemistry, cells, genetics, evolution, and human biology, using the dissection of a fetal pig to help understand anatomy. A variety of laboratory work will be carried out to support student understanding of the topics covered. Lab investigations will stress hypothesis formation, experimental design, collection and presentation of data, and interpretation of results. In addition to videos, animations, and supplemental readings, basic information is augmented by a variety of technologies. These include computer simulations of biological processes; spreadsheets for data gathering and analysis; and Internet research sites.

Note: This course is a prerequisite for Natural History of Living Things, Advanced Biology, the Chemistry courses, and Conceptual Physics, and is generally taken in the ninth or tenth grade year. Transfer students at tenth grade who have not yet taken a biology course are strongly urged to enroll. This course satisfies the life science graduation requirement.

Grades: 9-12

Term: All Year

### **Applied Engineering Design**

This semester long elective course, open to 9-12<sup>th</sup> grade students, is an introduction to the applied use of engineering design. Course activities focus on the application of knowledge and skills to encourage student interest in robotics, programming, and other engineering related fields. The course is organized around a series of engineering design challenges that allow students to integrate core ideas from science, technology, engineering and mathematics (STEM). During each design challenge students engage in disciplined problem solving and creative design to generate quality solutions that address meaningful technical, societal, economic, or esthetic problems present in the 21<sup>st</sup> century world. The course will be project based allowing students to participate in ‘rapid cycle’ design challenges that last a few days and ‘deep dive’ challenges that last several weeks. Example design challenges include creating a timed control system from found objects, fashioning a wearable sensing device, automating a household function, or designing a remotely controlled or automatous robotic animal motion.

During class challenges, students learn how to apply engineering design practices and mindsets to develop confidence with generating innovative and creative solutions. Teams of students work with key stakeholders or complete research to identify a human or societal need associated with each challenge. Each team brainstorms ideas, prototypes solutions, and iterates on these ideas, learning how to document work using a design

portfolio. All design challenges end with a formal communication of the collaboratively designed solution. Students are expected to describe how key science, mathematics, and technology concepts are represented in the designed solution and use data or mathematical models to substantiate claims about the reliability of the designed solution. Students learn technical skills such as using hand tools to construct devices, applying Computer Aided Design (CAD) software to make 3-D printed objects, assembling circuits that use servos to manage motion, and generating code to control data collection sensors. No pre-requisite skills or courses are required, but having taken Foundations of Computer Science is recommended.

This course satisfies 1 semester of the physical science graduation requirement.

Grades: 9-12 Term: Semester II

### **Natural History of Living Things**

The Natural History course introduces students to major phyla and classes of organisms. Students will gain an enhanced appreciation for the diversity and classification of living beings and their habitats. They learn about many adaptations that make different organisms unique and marvelous. The course is intended to be a stepping-stone for further study in science and biology.

The course is structured in two-week learning units. Students have the opportunity to share in the direction of the class by selecting what material will be explored next from a developed list of units. The principal forms of instruction include small-group work, group and individual projects (small and large), labs (including microscope-based), fieldwork, journaling, demonstrations, drawings, videos, and lecture format. Students grow in their skills for studying science, and they learn to give and receive appropriate constructive criticism in a collaborative and supportive environment. Instructional materials are chosen both to challenge students and to empower them. In addition to taking traditional tests and quizzes, students learn to use continuous self-assessment as a path to mastery.

Students must have taken Introductory Biology prior to enrollment in Natural History. The course is intended for Grade 10 students first and foremost, with 11<sup>th</sup> and 12<sup>th</sup> grade students admitted only if space is available.

Grades: 10-12

Term: All Year

Prerequisite: Introductory Biology

### **Chemistry**

This course introduces students to the “Central Science,” leading them in an exploration of the fundamental interactions of matter and energy. Students will learn about this subject through the following topics: atomic and electronic structure, bonding in chemical compounds, chemical reactions, periodicity, stoichiometry and states of matter. Through this material students will grow in their ability to handle an academic challenge as they learn to use the variety of study tools. Varied presentation styles including lectures, demonstrations, laboratory work and guided instructional activities, encourage students to

improve their study skills and habits by employing an assortment of learning experiences. Various assessment methods, including quizzes, tests, projects and lab experiments & reports, allow students to demonstrate their understanding in a variety of ways.

While Chemistry is a challenging physical science course and will provide a thorough understanding of the fundamental ideas of chemistry, it will not be as mathematically rigorous or cover as many topics as the Chemistry Honors course.

Grade Level: 10-12                      Term: All Year  
Prerequisite: Algebra I Advanced, Introductory Biology

### **Chemistry Honors**

This course introduces students to the “Central Science,” leading them in an exploration of the fundamental interactions of matter and energy. It is also a goal of this course to challenge students academically, while providing them with a variety of study tools with which to meet this challenge. Through the topics in this course students will grow in their ability to handle academic stress as they become better students. Varied presentation styles including lectures, demonstrations, laboratory work and guided instructional activities encourage students to find their best learning style and to improve their study skills and habits through an assortment of learning experiences. Various assessment methods, including quizzes, tests, portfolios, projects and lab experiments & reports, allow students to demonstrate their understanding in a variety of ways. The core topics that will be covered include atomic and electronic structure, bonding in chemical compounds, chemical reactions, periodicity, stoichiometry, states of matter, chemical equilibrium and acids and bases.

Prerequisite: Introductory Biology    Co-requisite: Algebra II Honors  
Grade Level: 10-12    Credit: 1            Length: All Year

***Chemistry Honors vs. Chemistry*** - What distinguishes Chemistry Honors from Chemistry is the pace at which the material is covered as well as an increased emphasis on topics that are more mathematically dependent. Students in Chemistry Honors are expected to work at an accelerated pace, and be able to use algebra easily and confidently. Algebra II Honors is at least a co-requisite for Chemistry Honors. Chemistry Honors provides an excellent foundation for Advanced Chemistry as well as college chemistry, and is appropriate for those interested in pursuing a career in science.

### **Conceptual Physics**

Physics is the fundamental, most basic science, the one on which all others depend! Everyone should learn physics, but not everyone is keen on the math. So this course is *Conceptual* Physics. In this course students learn about the fundamental forces and natural laws that shape the physical universe just as in any physics course. Students will encounter formulas, which scientists call "laws," but they will use them more as guides to understanding relationships rather than as equations to plug and chug out problems. Through numerous simulations, explorations and experiments students will learn about

kinematics, Newton's Laws of Motion, energy, heat, gravity, electricity and magnetism, and waves. Learning will be assessed through traditional tests and quizzes, but also through projects, lab practicals and activities like an egg drop contest and building models like space stations, satellites, or solar houses. Even though there is less emphasis on math problem solving, students are expected to have a working knowledge of Algebra. Algebra I Advanced and Introductory Biology are this course's prerequisites.

Because of the significant overlap in topics, students receiving credit for this course may not enroll in regular Physics in following years unless Chemistry is taken concurrently or prior to enrollment in Physics. This course satisfies the physical science graduation requirement.

Grades: 10-12

Term: All Year

Prerequisite: Algebra I Advanced, Introductory Biology

### **Earth, the Solar System, and the Universe (ESSU)**

This course is an elective introduction to the study of Earth systems science and astronomy. We begin with our home planet, following the path of ancient astronomers to learn more about Earth by studying the skies and developing models of the cosmos. We learn to identify constellations, bright stars, and the patterns of motion in the sky which lead to discoveries about the sun, the seasons, the moon, and the planets. Telescopes, optics, and remote sensing are introduced, and once we recognize that planets are complex systems we return to the planet we know best, delving into geologic history, global circulation patterns in the atmosphere and oceans, climate change, and the influence of humankind. A comparative study of planets in our solar system emerges, including technologies and spacecraft we have employed to investigate the Earth and our astronomical neighborhood. We continue to the stars, our Milky Way Galaxy, and the Universe beyond, including such subject matter as black holes, "doomsday" asteroids, extraterrestrial life, and other current and exciting topics in Astronomy. Laboratory exercises employ hands-on investigations, computer simulations, and observing sessions with the school's 12.5" telescope. The class is project-oriented, and is suitable for students across the spectrum of mathematical abilities: perfectly comfortable for students in Algebra II, yet offering exciting challenges to students in Calculus BC through serious mathematical and computational projects in astrophysics. Concurrent or previous experience in Chemistry is very helpful, and is strongly recommended.

Telescope observing sessions are scheduled throughout the year as part of the curriculum. Families and friends are invited to these sessions! We will also have several field trips to a planetarium. This course satisfies the physical science graduation requirement.

Grades: 10-12

Term: All Year

Prerequisite: Geometry

### **Advanced Topics in Solar and Planetary Science**

This course provides additional depth to students interested in space science and astronomy, as well as integrating science, technology, engineering and mathematics

(STEM) through a number of projects and detailed investigations. It is conducted in a University research seminar style, with brief teacher lectures on general background for a topic followed by individual student readings in the literature. Students will work in reading groups and share their current articles, and will additionally work on a personal investigation in which they delve into a topic in great depth each marking period. Topics may include but are certainly not limited to: Space Probe Design and Missions; Recent Discoveries from Solar System Explorations; Human Space Travel; Potential Commercial Operations in Space e.g. Mining and Extra-Solar Power; “Doomsday” Asteroids and our technological response to them; Telescope Photography and Measurements of Lunar and Solar Features; Searching for Life in the Solar System; and Science Fiction as a catalyst for advances in interplanetary science. This course satisfies the physical science graduation requirement.

Grade Level: 11-12

Term: Semester I

Prerequisites: ESSU, Analysis; Physics or Honors Physics (pre- or co-requisite)

### **Advanced Topics in Galactic and Extra-Galactic Astronomy**

This course provides additional depth to students interested in space science and astronomy, as well as integrating science, technology, engineering and mathematics (STEM) through a number of projects and detailed investigations. It is conducted in a University research seminar style, with brief teacher lectures on general background for a topic followed by individual student readings in the literature. Students will work in reading groups and share their current articles, and will additionally work on a personal investigation in which they delve into a topic in great depth each marking period. Topics may include but are certainly not limited to: Telescope design and instrumentation including space telescopes; Astro-photography using the school telescope including image processing and deep sky imaging; Radio Astronomy including using an actual research-grade radio telescope; Exotic states of matter in white dwarfs and neutron stars; Detecting extra-solar planetary systems and determining their ability to support life; Formation, structure, and evolution of galaxies; Black Holes and arguments for possible time travel; Observations and simulations of Large Scale Structure in the Universe; Dark Matter – theory and measurement of its distribution; The Supernova Cosmology Project – how new instrumentation and ideas help us figure out the ultimate fate of the Universe; and Cosmology as a glimpse into humanity – arts, literature, science, and philosophy as intertwined intellectual enterprises through which we seek to know ourselves. This course satisfies the physical science graduation requirement.

Grade Level: 11-12

Term: Semester II

Prerequisites: ESSU, Analysis; Physics or Honors Physics (pre- or co-requisite)

### **Physics**

This is a first course in algebra-based physics. It is a quantitative approach to understanding the laws of physics that will provide a solid foundation both conceptually and mathematically for future studies in science. Topics will include the nature of science, kinematics, Newton’s laws, gravity, energy, momentum, rotational motion, wave

motion, sound, electricity and magnetism, and light. Laboratory work, including construction of apparatus, measurement of physical parameters, and using computers for both data acquisition and analysis, will be a significant part of the course.

This course (or Physics Honors) is strongly recommended for students planning careers in science, engineering or medicine. This course satisfies the physical science graduation requirement.

Grades: 11-12

Term: All Year

Prerequisite: Algebra I, Geometry, Algebra II (either previously taken or currently enrolled)

### **Honors Physics**

Honors Physics is intended for science students who are serious about pursuing a challenging class in introductory physics. The topics are identical to those offered in physics but with more conceptually challenging problems and more detailed laboratory analysis. Solid working knowledge of algebra and trigonometry is essential. An emphasis will be placed on the discovery and consequences of the physical laws including ideas which run parallel to introductory calculus. Students are not required to be enrolled in calculus for this course but a strong math background is important. Topics will include Newtonian dynamics, waves, sound and introductory electromagnetic theory. Problems covered are equivalent to an introductory college level class in physics. This course prepares students to take the AP Physics B (Mechanics) exam. Students may also elect to take the AP Physics B (Electricity and Magnetism) exam though some additional instruction would be required to succeed in the Electricity and Magnetism portion. Either Physics or Honors Physics is strongly recommended for students planning careers in science, engineering or medicine. Students electing to take Honors Physics must carefully consider both their conceptual abilities as well as their work commitment. Honors Physics satisfies the physical science graduation requirement. Enrollment in this course is based on recommendation from a previous science teacher or permission of the instructor. Students enrolled in Honors Physics will need high level conceptual thinking skills and also be capable of doing a significant amount of conceptual learning work.

Grades: 11-12

Term: All Year

Prerequisite: Department Permission

Co-requisite: Analysis (either previously taken or currently enrolled)

### **Anatomy & Physiology**

This course is designed to introduce students to human anatomy and physiology, with an emphasis on the systems of the body and how they are interrelated. The major topics covered will include: basic human organization, support and movement, integration and coordination, maintenance, and reproduction and development. Students interested in pursuing careers in the health sciences will be delighted to find clinical applications throughout the core material. A significant portion of this course involves hands-on laboratory activities, with particular emphasis given to the comparative anatomy

dissection of a cat during the spring semester. We will also use online resources and interactive software to support our dissections and other laboratory work.

Grades: 11-12

Term: All Year

Prerequisites: Introductory Biology and either Chemistry or Chemistry Honors

### **Ecology and Global Sustainability**

How can *Homo sapiens* lead a fulfilling life and be in harmony with the ecosystems in which we exist? By recognizing that we play an integral role in each ecosystem. In Ecology and Global Sustainability, we investigate our roles in the various ecosystems in which our human lives exist. Our investigation integrates multiple academic disciplines within the science department and from other departments. In this way we seek to grasp the interrelationships of the natural world, to identify and analyze environmental problems, (both natural and human-made) to evaluate the relative risks associated with these problems, and to examine alternative solutions for resolving or preventing them.

In this course, we will develop the conceptual tools for dealing with complexity using a systems approach to problem solving. We will explore historical and current events to determine system boundaries, and study ecosystems in which humans' serve a variety of roles. The principal forms of instruction include small-group work, group and individual projects (small and large), labs (including microscope-based ones), fieldwork, demonstrations, drawings, videos, and lecture format. Instructional materials will both challenge students and empower them. Students learn to use continuous self-assessment as a path to mastery. The course will use outdoor classwork to give students hands-on experience in environmental data collection and analysis. Students will be encouraged to critically and creatively think about how humans can live a in low-impact manner.

Since this course is a capstone science course, priority will be given to Seniors who have taken Intro Biology, one of the Chemistry and one of the Physics courses.

Grade: 12 (Priority) (11 only if space is available)

Prerequisite: Introductory Biology

Recommended: Chemistry

### **Advanced Biology**

Advanced Biology aims to provide students with the conceptual framework, factual knowledge, and analytical skills necessary to deal critically with the rapidly changing science of biology at a post-secondary level. This course focuses on four Big Ideas in biology: evolution, energy processes, genetics and information transfer, and interactions. These ideas encompass the core principles and theories of all living systems. Current issues and breakthroughs in the field of cellular, molecular, evolutionary and population biology will be an ongoing part of class discussions. Through the study of these Big Ideas, students develop strong conceptual/theoretical understanding of biology.

A significant portion of this course involves hands-on lab activities with particular emphasis on student-designed extensions of labs to integrate their understanding of the

topics covered in class. As a part of the lab component, students will be introduced to statistical analysis of results and writing up lab research in the format expected by many college courses and journals. Students must have successfully completed both Introductory Biology and Chemistry or Chemistry Honors prior to enrollment in Advanced Biology.

Grades: 11-12            Term: All Year  
Prerequisite: Introductory Biology and a Chemistry course

### **Advanced Chemistry**

Advanced Chemistry is a second year chemistry course. In this course we will address the fundamental question: “What makes a chemical reaction happen?” Answering this question will involve the investigation of properties of elements and compounds, understanding of atomic theory, explorations in the states of matter and the gas laws. We will also explore chemical kinetics, chemical equilibrium, acid - base chemistry, thermodynamics and electrochemistry. This course is designed to be similar to a general chemistry college course in terms of pace, content and expectations for understanding. Laboratory skills, techniques and analysis will be a major aspect of the course. Students will be prepared to take the AP Chemistry exam in May if they so choose.

Solid mastery of the first year material in Chemistry or Chemistry Honors is essential for success in this course. Students should have a strong ability to problem solve using mathematics. Current science teacher’s recommendation is required for enrollment in this course.

Grades: 11 - 12            Term: All Year  
Prerequisite: Chemistry or Chemistry Honors

### **Advanced Calculus-Based Physics**

Calculus-based physics is an essential course for students considering a career in science or engineering. This course is a full year introduction to physics at the college level. The first semester is an introduction to kinematics, Newtonian dynamics, momentum, energy, rotational motion, orbital dynamics, harmonic motion and waves. The second semester will complete the topics of mechanics and as time permits will introduce the students to Maxwell’s equations through the study of electricity, circuits and magnetism. In all topics, advanced laboratory experimentation will complement the theoretical study.

*This course is occasionally taken by 11th graders who are taking calculus concurrently but is normally elected by seniors. This course prepares students to take the AP Physics C (Mechanics) exam. Students may also elect to take the AP Physics C (Electricity and Magnetism) exam.*

Grade: 12            Term: All Year  
Prerequisite(s): Honors Physics (or permission of instructor); Co-Requisite: Calculus AB or equivalent

### **Advanced Research Class**

The Advanced Research Class is to be taken by those students who successfully complete the summer phase of the Research Internship opportunity after their junior year. During the fall semester of their senior year, students will conduct a statistical analysis of their data, carry out background reading on their research topic, and write up their results in a formal (professional level) research paper worthy of a scientific journal (Abstract, Introduction, Background, Materials and Methods, Results, Conclusion, and Bibliography). Students will also prepare the application for the Intel Science Talent Search and the Southeast Michigan Science Fair. In essence the students will work on professional level research presentation talks, prepare conference posters, and take part in and lead journal club discussions. The course will conclude with a research project presentation to next year's prospective research students at the end of the fall semester.

Note: Students who receive placement through Greenhills Advanced Research Program are required to complete the Advanced Research Course including the summer research and the first semester coursework of their senior year. Seniors who have spent a similar amount of time in a research experience during the summer between their junior and senior year, but not specifically in the Advanced Research Program, may also elect this class with departmental permission. Students who elect to do their research in Mathematics, Statistics, or Computer Science can receive Math credit for this course in lieu of Science credit. Please see the Math Department Head to discuss this option. This course is worth 1 credit with the full credit awarded and recorded on the transcript upon successful completion of the fall semester course work in the senior year.

Grade: 12

Departmental Permission is required for this course

## ***Interdisciplinary***

### **UPPER SCHOOL**

#### **Perspectives in Humanities**

This course follows an innovative format in order to allow students and teachers to take several deep dives into passion projects oriented around the Humanities. The goal is depth over breadth. Students will take part in a series of two-week units of intensive instruction on topics in the realm of fine and performing arts, history, literature, and philosophy. In recent years, research has shown that engaging with the Humanities enables students to expand their critical thinking and cultural understanding, to develop compassion and empathy, and to identify new areas of interest for lifelong learning. In addition to exploring a variety of topics, students in this course will develop a metacognitive lens for their work and be exposed to diverse models for sustained study. A central question for the course is: What captures our curiosity and how do we cultivate that fascination?

Each two-week unit will be taught by a different instructor or instructor team and will be followed by a week of self-study to complete a culminating project on the previous unit and to prepare for the upcoming unit. Culminating projects for each unit may include essays, reflections, multimedia projects, presentations, or performances. At the end of each semester-long course, students will reflect on their experiences, research a topic of their choice, and present their projects to a wider audience.

Perspectives in Humanities A and B are separate, semester-long courses; students may sign up for one or both semesters. This course counts as a general elective and does not substitute for a graduation requirement in any department.

Grades: 10-12

Term: Semester I or II

*Perspectives in Humanities A* — Fall Semester:

Women in Comics: Heroes and Anti-heroes

“Here Be Dragons”: Mapping the Unexplored Territories of Our Creative Minds

A Brief History of Mathematics

Undead Austen: Why Do We Resurrect Classics?

*Perspectives Humanities B* — Spring Semester:

From East to West: Contemplative Practices

African American Women’s Visual Art & Social Commentary

Off With His Head?! An In Depth Look at Revolutions in Our World’s History

Sleepless in Ann Arbor: Is There Room for the Rom-Com in 2019?

NOTE: Units are subject to change and will differ from year to year.

## ***Service Learning***

### **UPPER SCHOOL**

The purpose of the service learning requirement is to meet our schools’ mission to “help young people become responsible citizens... whose meaningful and balanced lives will better the world”. Service learning teaches the skills of civic participation and develops an ethic of service and civic responsibility. Students can provide service in the community on a voluntary basis to public, nonprofit agencies, civic, charitable and governmental organizations and on our school campus. Greenhills students will complete at least one service learning experience every calendar year in the Upper School. Service projects must include a participation minimum of three times or ten hours. Students will log hours and submit a reflection using the x2VOL online program for each project.