ONE SCHOOLHOUSE
*partners in innovation*

# Student Course Catalog: 2017-2018

*Welcome to the One Schoolhouse 2017-2018 Course Catalog! At One Schoolhouse, we offer single gender courses through our Online School for Girls and Online School for Boys programs, and co-ed courses through our Online Independent School program. You can navigate to the course descriptions by clicking the links below or by scrolling through the catalog, which is organized by subject area. Meet the teachers for these courses by visiting our website. If you have any questions, don't hesitate to contact us at 301-842-4674.*

## Summer 2017

Geometry (girls, co-ed)
Introduction to Computer Science (co-ed)
Pre-Calculus (co-ed)
World Religions (co-ed)

## 2017-2018 School Year

**AP Courses**

AP® Art History (girls, co-ed)
AP® Calculus AB (co-ed)
AP® Calculus BC (girls, co-ed)
AP® Chinese Language and Culture (co-ed)
AP® Computer Science A (girls, co-ed)
AP® Computer Science Principles (girls, co-ed)
AP® English Literature and Composition (co-ed)
AP® Environmental Science (girls, co-ed)
AP® French Language and Culture (co-ed)
AP® Human Geography (co-ed)
AP® Latin (co-ed)
AP® Macroeconomics (girls, co-ed)
AP® Microeconomics (girls, co-ed)
AP® Music Theory (girls, co-ed)
AP® Physics 1 (girls)
AP® Physics C - Mechanics (girls)
AP® Psychology (girls, co-ed)
AP® Spanish Literature & Culture (co-ed)
AP® Statistics (girls, co-ed)
AP® US Government & Politics and AP® Comparative Government & Politics (girls, co-ed)

**Non-AP Courses**

Art History (girls, co-ed)
Chinese III/IV (co-ed)
Chinese V (co-ed)
Civics, Culture, and Intersectionality (co-ed)
Creating Tomorrow: Computer Science by Design (girls)
Gender and Sexual Identity in America (co-ed)
Engineering, Design, and Robotics (girls)
Forensic Science (girls)
French V (co-ed)
Independent Study (girls, co-ed, boys)
Introduction to Computer Science (girls, co-ed)
Latin I (co-ed)
Latin II (co-ed)
Latin III/IV (co-ed)
Linear Algebra (girls)
Marine Science (co-ed)
Multivariable Calculus & Differential Equations (girls, co-ed)
Neuroscience (girls, co-ed)
Psychology (girls, co-ed)
Spanish V: Literature & Culture (co-ed)
Statistics (girls, co-ed)

# Summer Courses – 2017

*Summer courses are intensive for-credit opportunities for ambitious students. Students participating in these courses should plan to devote 25-30 hours per week for eight weeks to their course. Students receive grades and comments in these classes, which are the equivalent of year-long, high-school level courses. Because of the pacing and intensity of for-credit summer courses, students must have the ability to login and complete work for their course daily; students must be available and have internet access for all eight weeks of the course. See our calendar here.*

**Geometry**

*Prerequisite: Successful completion of Algebra I*

*Offered: Girls and Co-ed*

Geometry forms the foundation for key concepts in advanced math courses. This course covers a full year of geometry in eight weeks by addressing traditional geometry topics including lines, angles, polygons, and circles. Students explore concepts directly through their own investigations, make and test conjectures about what they observe, and apply these conjectures to solve problems and create new conjectures. Multiple and varied tools—from folded paper, to straightedge and compass, to interactive geometry software—are used for the investigations, which are designed to develop students' cooperation, problem-solving, spatial reasoning and communication skills. Assessments include multiple-choice and short-answer test questions, discussion prompts, and both group and individual projects.

**Introduction to Computer Science**

*Prerequisite: None*

*Offered: Co-ed*

The goal of this course is to create an environment where students develop the skills to express their creativity in various programming languages. The course starts by introducing students to basic programming constructs and techniques using a simple but powerful drag-and-drop programming language in an animated environment. Students learn to create simple apps, explore a Java-like language that incorporates an electronic sketchbook with graphics and animation, and finally move on to object-oriented programming with 3D graphics. Students will learn to program in languages such as Scratch, App Inventor, HTML, JavaScript, and Processing. Throughout the course, students conduct research and collaboratively investigate current issues surrounding computer science, specifically focusing on recent events involving computer science and the issues surrounding women in technology. By the end of the course, students understand how relevant and important computer programming is in the world around them. This course prepares students for all advanced One Schoolhouse computer science courses.

**Pre-Calculus**

*Prerequisite: Geometry and Algebra II or equivalent*

*Offered: Co-ed*

This pre-calculus course covers a full year of pre-calculus in eight weeks by addressing the algebraic and trigonometric concepts that lay the foundation for AP Calculus AB or BC. Students begin by reviewing the unit circle, and build to trigonometric identities and trigonometric equations. They then examine and apply geometric and algebraic representations of vectors; conic sections; polynomial, rational, exponential and logarithmic functions; and sequences and series. Students preparing for AP Calculus BC also have the option of studying polar coordinates, parametric functions, and limits. Students demonstrate mastery through multiple-choice and short-answer test questions, discussion prompts, and both group and individual projects.

**World Religions**

*Prerequisite: Successful completion of one year of high school history or permission from the administration*

*Offered: Co-ed*

This course is a full year social science credit examining the major religious traditions of the world. In the first half, students explore the history and beliefs of the major religions of the world today – Buddhism, Hinduism, Islam and Judeo-Christianity, – before examining the intersection of cultural, political, and socio-economic forces that influence and are influenced by faith traditions. With this foundation, in the second half students take deep dives independently and collaboratively into faith practices of their choosing, such as New Age Religions, Paganism, Shinto, Sikhism, Taoism, Zoroastrianism, or the beliefs of indigenous peoples of Africa, the Americas, or Australia. Students demonstrate understanding through critical analysis,

research papers, and alternative assessments.

# School Year Courses – 2017-2018

## Art Courses

**AP® Art History and Art History** – *see below under Social Science Courses*

**AP® Music Theory**
*Prerequisite: Ability to read at least one clef of music and proficiency in an instrument or voice*
*Offered: Girls and Co-ed*
AP® Music Theory introduces advanced concepts of music theory to students. The aim of this course is to improve students' performance, aural, analytical, and composition skills. AP® Music Theory is an intensive, fast-paced course that touches on aspects of melody, harmony, texture, form, musical analysis, and composition. This course also includes an aural section of sight-singing, melodic and harmonic dictation, and listening examples. Each student composes and perform original compositions, both as an individual and in a group setting. All students enrolled in this course take the Advanced Placement exam in the spring. Yet AP® Music Theory is not just about the exam; students experience growth in their performance skills and all around musicianship. This is a crucial course for anyone looking to pursue music professionally or for anyone who wants to pursue their passion in music.

**Creating Tomorrow** – *see below under Computer Science Courses*

## Computer Science Courses

*One Schoolhouse offers a complete four-year computer science sequence, but students are not required to take these courses any particular order. For students who do want to take the four-year sequence, we recommend this order: Introduction to Computer Science, AP Computer Science Principles, AP Computer Science A, Creating Tomorrow. Course prerequisites may be met through prior courses, or through extracurricular programming experiences with permission of the One Schoolhouse administration.*

**AP® Computer Science A**
*Prerequisite: Successful completion of a One Schoolhouse computer science course or permission from the administration*
*Offered: Girls and Co-ed*
The AP® Computer Science course introduces the key concepts and techniques of object-oriented programming in Java. The analytic, critical-thinking, and problem-solving skills developed in this course transfer to programming in other languages on a variety of platforms. This course is designed with the idea that programming should be fun, engaging, and intuitive. Students work creatively and collaboratively with their classmates and develop a solid foundation from which to launch into a wide range of computer science areas. In today's world, having an understanding of programming concepts as well as the ability to approach problems with a "programmer's eye" have become essential skills for students and professionals. This course prepares students for the AP® Computer Science A Exam in May.

**AP® Computer Science Principles**
*Prerequisite: None, although prior programming experience recommended*
*Offered: Girls and Co-ed*
Computer science and computing technologies are everywhere, and used in just about every imaginable occupation. This course investigates the "big ideas" found in our digital world such as the creativity in finding solutions to authentic problems, how data and information are used to forecast events and predict behaviors, and the global impacts of technology and the Internet. Using Python, students create computer programs that serve useful functions, explore the different means of representing information digitally, and discover new knowledge through the use of large data sets. Students discuss the current state of technology and its role in our everyday lives, and develop their skills in computational thinking, logical reasoning, and describing processes through algorithms. Finally, students demonstrate their learning by creating a portfolio for submission to the College Board and are prepared for the AP® Computer Science Principles exam in May.

**Creating Tomorrow: Computer Science by Design**
*Prerequisite: Successful completion of a One Schoolhouse computer science course or permission from the administration*
*Offered: Girls*
In the digital world, the importance of intentional design through the lens of the user experience can't be underestimated. In this course, students enhance their design and technology skills by using the design process to create software products relevant to the digital age in which we live. Combining software engineering and entrepreneurship, students create digital products using a variety of software tools and computer languages, and learn how to brand and market these products and services such as games, web sites, videos, mobile applications, etc. The design and development of their products require study in market research, conceptual design, prototype development, product implementation and testing, as well as branding and social media marketing strategies for the final product launch. Students have a choice in selecting topics or issues of interest and, through extended project work, are able to pursue their interests in depth. By the end of the course, students develop a portfolio of their work and a digital product that they may continue to develop and market forward.

**Introduction to Computer Science**
*Prerequisite: None*
*Offered: Girls and Co-ed*
The goal of this course is to create an environment where students develop the skills to express their creativity in various programming languages. The course starts by introducing students to basic programming constructs and techniques using a simple but powerful drag-and-drop programming language in an animated environment. Students then learn to create simple apps, explore a Java-like language that incorporates an electronic sketchbook with graphics and animation, and finally move on to object-oriented programming with 3D graphics. Students will learn to program in languages such as Scratch, App Inventor, HTML, JavaScript, and Processing. Throughout the course, students conduct research and collaboratively investigate current issues surrounding computer science, specifically focusing on recent events involving computer science and the issues surrounding women in technology. By the end of the course, students understand how relevant and important computer programming is in the world around them. This course prepares students for all advanced One Schoolhouse computer science courses.

## English Courses

**AP® English Literature and Composition**
*Prerequisite: Successful completion of two years of high school English or permission from the administration*
*Offered: Co-ed*
True communication -- one small human voice finding its way to another's quiet, beating heart -- takes effort on the part of both the reader and the speaker/writer. Students enrolled in AP® English Literature and Composition have the opportunity to practice a graceful swan dive into what it means to listen as well as what it means to speak with their own authentic voices. They consider fiction, drama, poetry, and short stories from the 1600s to the present, intent on discovering how each work portrays some facet of the universal human condition. Further, they examine the way each writer chooses and then employs the artistic tools at his or her disposal -- including genre, structure, imagery, symbolism, and rhetorical devices -- in order to support a very individual worldview. In other words, we look closely at the interplay between content (the story a writer wants to tell or the moment he or she wants to capture) and form (the way the story or moment is offered to the reader). Students' successes are largely dependent upon creating dynamic and meaningful connections with their teacher and classmates, making personal connections to the material, composing individual learning goals, gaining the confidence to be both curious and creative, and are willing to take intellectual risks. Students are expected to be engaged in the course materials and to be creators of class content. Students gain the necessary reading, writing, and critical-thinking skills for success on the AP® exam in May. Equally important, they have amassed incontrovertible proof that every choice we make -- whether we are artist or architects, engineers or chefs or dog walkers -- has an effect on someone else.

## Foreign Language Courses

*One Schoolhouse offers combined AP® and Level V language courses in Chinese, French, and Spanish, and combined III/IV courses in Chinese and Latin. These combined courses are designed to serve a wide range of learners and are personalized to meet learners where they are. We also offer a complete Latin sequence.*

# Chinese

### Chinese III/IV

*Prerequisite: Successful completion of Chinese II or III*

*Offered: Co-ed*

Chinese III/IV is a rigorous class that prepares students to enroll in One Schoolhouse's AP® Chinese Language and Culture or Chinese V course the following year. The course is designed for students who have had at least two years of Mandarin study, and takes them through an intensive year in preparation for AP or college level study. Students focus on developing the four language competencies (listening, reading, speaking, and writing), while building proficiency in applying Mandarin in a variety of real-life situations. This class begins by shoring up deficiencies and honing basic skills from prior courses; as such, it is a combined class for students of varied backgrounds. After the knowledge-based learning and reviewing in the first quarter, students transfer their focus from gaining task-related vocabulary and grammar structures to taking abundant opportunities for language application and skill training. Students are exposed to more practical vocabulary and more complex syntax to function accurately within a native Chinese urban environment. Unrehearsed listening and reading texts, engaging essays, authentic projects and virtual field trips, and classroom discussions and debates are sequentially added so that students develop both communication and language learning strategies through socio-cultural context or linguistic features. A variety of audio, visual, and textual materials are carefully selected based on the interests and preferences of the students, which reflect the diversity of students' lives, and range from school-based activities to personal/social issues in health, adolescence, part-time work, relationships, customs, technology, and the environment. Students are highly encouraged to enjoy speaking Mandarin and making productive mistakes within the course. Students enrolling in this course should be prepared for a range of collaborative and individual activities each week, including speaking in real time with each other and the instructor. By the end of this course, students are able to relate past, present, and future experiences to conduct complicated daily activities in Mandarin.

### AP® Chinese Language and Culture
### Chinese V

*Prerequisite: Successful completion of One Schoolhouse's Chinese III/IV or permission from the administration*

*Offered: Co-ed*

AP® Chinese Language and Culture provides deeper understanding and broader application into Chinese language and culture for intermediate Chinese learners. This course focuses on applying Chinese language and cultural skills in real-world problem situations, and provides the opportunity to experience a variety of topics in Chinese history, geography, music and arts, literature, daily life, and national and global issues. Almost all of the course is taught in Chinese. This course applies a student-centered diagnostic learning approach. Authentic resources in both oral and written Chinese include recorded lectures, online discussion and debate, TV and video clips, Chinese newspaper articles, and instructions from Chinese products. Group work, one-to-one extra help, and a variety of engaging activities and experiential projects are employed in the course to meet the individual needs of students. In this multi-track course, students may select the AP® or Chinese V track, depending on whether they plan to take the AP® exam in May. AP® students are expected to delve deeper into the topics, take AP®-style assessments, and prepare for the AP® exam. Chinese V is recommended for students who have completed four or more years of Chinese but do not want to prepare for the AP® exam.

# French

### AP® French Language and Culture
### French V

*Prerequisite: Successful completion of French IV, or French III and immersion experience*

*Offered: Co-ed*

The goal of AP French Language and Culture and French V is for each student to be able to interpret and discuss historical, cultural, and current event topics pertaining to the various communities that exist in France and the Francophone world. Students analyze, interpret, and synthesize information from sources such as news articles, literary works, songs, video clips, films, documentaries, advertisements, personal emails, and voice messages. Students are also encouraged to express informed personal opinions and conclusions regarding the material to which they are exposed. They compare and contrast different cultural practices within the Francophone world as well as observe similarities to and differences between the Francophone world and their own. Students engage with French language and culture through creative and collaborative activities. Six topics are explored throughout the course: Personal and Public Identities, Families and Communities, Global Challenges, Science and Technology, Contemporary Life, and Beauty and Aesthetics. In this multi-track course, students may select the AP® or

French V track, depending on whether they plan to take the AP® exam in May. AP® students are expected to delve deeper into the topics, take AP®-style assessments, and prepare for the AP® exam. French V is recommended for students who have completed three or four years of French but do not want to prepare for the AP® exam.

## Latin

### Latin I

*Prerequisite: None*
*Offered: Co-ed*

Latin I is intended for students who have not previously studied Latin. The course develops competencies in reading and interpreting, oral expression and aural comprehension. Students learn the basic components and structures of Latin that allow them to develop basic reading strategies, which they use to build critical-thinking skills. Upon completion of this course, students have acquired proper pronunciation, essential grammar and vocabulary to be able to understand and read short passages; the ability to engage in simple verbal exchanges; and a greater knowledge of English vocabulary and grammar. Learning Latin is also about discovering connections and relationships between ancient and contemporary languages, cultures, and influential ideas. Latin I students study Roman culture and history so they can examine the indebtedness of modern society to the Roman world, from legendary heroes to myths, gods, and politics. Students take quizzes and have tests, but they also write stories, sing songs, play games, and work together on short research projects to further understand how their developing knowledge of Roman culture applies to their own lives.

### Latin II

*Prerequisite: Successful completion of Latin I*
*Offered: Co-ed*

The Latin II course continues the study of the language, culture and history of the ancient Romans. By the end of the year students gain extensive experience in various competency areas of the language: reading and interpreting, oral expression and aural comprehension. Students continue to learn and practice linear-reading strategies that build critical thinking skills. At every step of the way students expand their English vocabulary through the study of Latin word roots. In addition, significant time is devoted to the study of areas of Roman culture and history as presented through the products of the Romans such as art, architecture, and engineering techniques. Students also examine evidence of Roman daily life and compare the ancient Roman customs to those of the modern world. Every unit of Latin II incorporates linguistic and cultural/historical material. Many of the unit assessments are collaborative projects with personalized pathways requiring that students work together to create linguistic, artistic and creative materials that demonstrate their understanding of the unit content.

### Latin III/IV

*Prerequisite: Successful completion of Latin II*
*Offered: Co-ed*

Latin III/IV is a rigorous class that prepares students to enroll in One Schoolhouse's AP® Latin course, as they comprehend increasingly grammatically and culturally challenging texts. This class begins by shoring up deficiencies and honing basic skills from prior courses; as such, it is a combined class for students of varied backgrounds. After reading stories of famous Romans at the intermediate level of Latin, students collaborate in reading authentic Latin literature from a variety of possible authors such as Livy, Martial, Catullus, Sulpicia, Ovid, Caesar, Cicero, and Vergil on such topics as love, politics, war, leadership, marriage, the family, friendship, Roman values, mythology, and religion. Students read selected English translations from Greek and Roman authors in order to gain a wider understanding of Roman culture and literature, to provide some background for the Latin readings, and to connect with our contemporary world. Students work towards developing four basic competencies: reading and comprehending Latin poetry and prose, translating Latin as literally as possible, gaining a deeper understanding of the historical context of literary works, and analyzing Latin texts as works of literature. Students review basic grammar throughout the year and learn more complex grammatical and syntactical structures, such as indirect statement, participles, the ablative absolute, the gerund and gerundive, and various uses of the subjunctive. Students study literary devices and meter and learn how to analyze and interpret Roman literature as a creative genre, while gaining deeper contextual knowledge of the social and political conditions of the Republic and early Empire. Finally, students write essays that are supported with evidence from a Latin text, demonstrate their knowledge of Roman perspectives in a variety of ways, as well as engage in discussions about the connections between Roman culture and modern cultures today.

**AP® Latin**
*Prerequisite: Successful completion of at least three years of high school Latin*
*Offered: Co-ed*
AP® Latin students are challenged to read and analyze passages of Caesar's *Gallic Wars* and Vergil's *Aeneid*. The emphasis of the course is on reading and understanding the works of these two authors, as well as diving into the historical context of both works. We also look at literary devices and discuss how each author uses Latin and to what effect. Students practice these analytical skills not only on the proscribed passages, but also on sight passages from various authors with weekly assignments. We compare the writings of Vergil and Caesar to modern authors and explore the effect these authors have on our world today in class discussions. Students prepare translations and essays under time constraints similar to those on the AP® exam. Additionally, students peer edit essays to help strengthen their writing and analysis skills. All students enrolled in this course are thoroughly prepared to take the Advanced Placement exam in the spring.

## Spanish

**AP® Spanish Literature and Culture**
**Spanish V: Literature and Culture**
*Prerequisite: Successful completion of Spanish IV, or Spanish III and immersion experience*
*Offered: Co-ed*
The AP® Spanish Literature and Culture and Spanish V: Literature and Culture course provides a college level survey of texts from Peninsular, Latin American and U.S. Hispanic authors. Students complete readings from the College Board required reading list for the AP® Spanish Literature and Culture course and learn to analyze the works within their social and historical context and as expressions of major literary movements. Students build an understanding of form, structure, theme and literary devices and how each of these enhances the understanding of a text, as well as an understanding and appreciation of the rich variety of literature in Spanish, of the value of literature as an expression of Hispanic cultures and of the universal purpose of literature in general. The course is organized around the six themes designated by the AP® curriculum framework and conducted entirely in Spanish. In this multi-track course, students may select the AP® or Spanish V track, depending on whether they plan to take the AP® exam in May. AP® students are expected to delve deeper into the topics, take AP®-style assessments, and prepare for the AP® exam. Spanish V is recommended for students who want to read literature in Spanish but do not want to prepare for the AP® exam.

## Math Courses

**AP® Calculus AB**
*Prerequisite: Successful completion of Pre-Calculus*
*Offered: Co-ed*
The AP® Calculus AB course is a standard course in the calculus of a single variable. The goal is to teach conceptual reasoning, enabling students to present a solution algebraically, geometrically, numerically or verbally. Emphasis is placed not only on a clear understanding of the concepts, but also on their applicability in real world situations. All of the topics in the AP® Calculus AB syllabi are covered, as well as additional topics as time permits. Major topics include limits, continuity, derivatives and applications, integrals and applications, and first order linear differential equations. This student-centered course features discussions, reflections, and projects that help students to master the course material in an engaging way. Students enrolled in this course are thoroughly prepared to take the AP® exam in the spring.

**AP® Calculus BC**
*Prerequisite: Successful completion of Pre-Calculus or Calculus course covering natural logarithms, series/sequences, parametric/polar functions, vectors, and limits*
*Offered: Girls and Co-ed*
The AP® Calculus BC course is a standard course in the calculus of a single variable. The goal is to teach conceptual reasoning, enabling students to present a solution algebraically, geometrically, numerically or verbally. Emphasis is placed not only on a clear understanding of the concepts, but also on their applicability in real world situations. All of the topics in the AP® Calculus BC syllabi are covered, as well as additional topics as time permits. Major topics include limits, continuity, derivatives and applications, integrals and applications, first order linear differential equations, inverse trigonometric functions, transcendental functions, infinite series, Taylor polynomials, vectors, parametrically defined functions, and polar coordinates.

This student-centered course features discussions, reflections, and projects that help students to master the course material in an engaging way. Students enrolled in this course are thoroughly prepared to take the AP® exam in the spring.

**AP® Statistics**
**Statistics**
*Prerequisite: Successful completion of Algebra II*
*Offered: Girls and Co-ed*
AP® Statistics helps students develop strategies for collecting, organizing, analyzing, and drawing conclusions from data. Each student is expected to learn how to articulate methodology, data description, and conclusions and to provide constructive comments on reports by classmates. Much of the knowledge learned in this course comes through experiential activities that challenge students to design, administer, and tabulate results from surveys and experiments. The students often work in small collaborative groups to explore problems and share ideas. Active participation, in the form of individual and group projects, peer review of student work, and discussion board conversations, are key to student success. Students may select the AP® or non-AP® track in this course. AP® students are expected to delve deeper into the topics, take AP®-style assessments, and prepare for the AP® exam in the spring.

**Linear Algebra**
*Prerequisite: Successful completion of AP® Calculus AB or equivalent*
*Offered: Girls*
Linear algebra is the study of vectors, the spaces in which they live, and linear mappings between those spaces. It gives us a powerful new way to think mathematically, and it has many applications in science, engineering, economics, and any field in which multiple variables interact in ways that can be modeled by systems of linear equations. It's therefore a required and very useful subject in college for many science and engineering majors. This yearlong course covers a typical one-semester college linear algebra curriculum, with topics including matrix algebra, vector spaces, eigenvalues and eigenvectors, and applications to differential equations. In the sequence of standard math courses, linear algebra can be studied either before or after multivariable calculus. It's a great fit for the student who has completed AP® Calculus AB or BC, who is passionate about challenging herself to think in new ways, and who wants to increase her ability to tackle problems in the real world.

**Multivariable Calculus and Differential Equations**
*Prerequisite: Successful completion of AP® Calculus BC or equivalent*
*Offered: Girls and co-ed*
After covering some advanced topics in the calculus of a single variable, Multivariable Calculus and Differential Equations explores topics that are studied in a typical college-level Calculus III course, including vectors and vector-valued functions, curves and surfaces in space, partial derivatives and gradients, multiple integration, and line and surface integrals. The course's final unit provides an introduction to differential equations, including exact first-order equations, second-order homogeneous and nonhomogeneous linear equations, and series solutions. Built on a foundation of sophisticated problem solving, the course also features discussions, projects, and exploratory activities that help students develop their advanced math skills in a collaborative and creative way.

## Science Courses

**AP® Environmental Science**
*Prerequisite: Successful completion of one year of high school laboratory science or permission from the administration*
*Offered: Girls and Co-ed*
AP® Environmental Science provides students with the scientific principles, concepts, and methodologies required to understand 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 and/or preventing them. Humans have made an enormous impact on the Earth, particularly in the past few decades, with our advances in technology, rapid population growth, and excessive energy use. Our own survival depends on developing practices that achieve sustainable systems that are both economical and ecologically friendly. Therefore, much of the course consists of ethical discussions and collaborative projects designed to probe how different cultures and social structures affect the

environment, and to explore potential solutions to today's environmental issues. Students in AP® Environmental Science engage collaboratively to investigate the real-world problems that face our environment today such as biodiversity loss, energy conservation, and climate change. They study not only our environment but also work collaboratively to understand our role in it. Students taking this course are well prepared for the AP® Environmental Science Exam in May.

**AP® Physics 1**

*Prerequisite: Successful completion of Algebra II*

*Offered: Girls*

AP® Physics 1 is an algebra-trigonometry based, introductory college level physics course. The course is based on first semester introductory college physics and is designed for those planning to enter into life science or pre-med programs in college. The goal of the course is to develop in the student the understanding of physics through inquiry-based investigations. Students explore principles of Newtonian mechanics, work, energy, power, waves, sound, and simple circuits. Additional supplemental topics are covered that build understanding of the primary College Board curriculum. Developing the ability to reason qualitatively and quantitatively is a principal focus. Those skills are developed through the use of modeling, graphing, diagramming, unit analysis, symbolic algebra, and data analysis. Laboratory exercises are used to enhance the investigation of each topic. This course is intended to prepare students for the College Board AP® Physics 1 Exam.

**AP® Physics C - Mechanics**

*Prerequisite: Successful completion of Calculus*

*Offered: Girls*

AP® Physics C Mechanics is a calculus based, college level physics course. The course is especially designed for those students planning to enter college programs such as engineering or physical sciences. The goal of the course is to develop in the student the understanding of physics through inquiry-based investigations. Students explore principles of Newtonian mechanics, work, energy, power, systems of particles, linear momentum, circular motion, rotation, oscillations, and gravitation. Differential and integral calculus is used during the course. Additional supplemental topics are covered that build understanding of the primary College Board curriculum. Developing the ability to reason qualitatively and quantitatively is a principal focus. Those skills are developed through the use of modeling, graphing, diagramming, unit analysis, symbolic algebra and calculus, and data analysis. Laboratory exercises enhance the investigation of each topic. This course is intended to prepare students for the College Board AP® Physics C Mechanics Exam.

**Forensic Science**

*Prerequisite: Successful completion of one year of high school laboratory science or permission from the administration*

*Offered: Girls*

Forensic Science examines the application of science to the criminal and civil laws enforced by the criminal justice system. Students explore the science of criminology by using a combination of science disciplines, including biology, chemistry, physics, geology, and computer technology. Students learn to differentiate between actual techniques and some of those portrayed on popular television shows and also evaluate current procedures used by real crime labs to understand some of the limitations of the law, police, and forensics science. Throughout the year, students examine scientific techniques behind the analysis of physical and chemical evidence, toxicology, DNA fingerprinting, fire and explosives, glass, bones, handwriting and document analysis, and other relevant pieces of evidence. Simulated crime and accident scenes are investigated, and as evidence is collected and analyzed, students develop observation skills and deductive reasoning. The course also includes a study of the variety of careers in forensic science. This exploration is completed through a mixture of laboratory exercises, class discussions and projects, online simulations and games, and analysis of representation of forensic science in the media.

**Engineering, Design, and Robotics**

*Prerequisite: Successful completion of one year of high school laboratory science or permission from the administration*

*Offered: Girls*

Engineers create things. They are the designers of the modern world. The works they create drive society forward. This course introduces students to many areas of engineering, including: civil/structural, chemical, mechanical, electrical, and biomedical engineering. In addition, students learn the engineering design process used by practicing engineers. Specific topics in this course include structural integrity with egg contraptions, chair and bridge building projects, engineering ethics, heat transfer and home heating, energy transmission, and alternative energy research with specific case studies in solar and fuel cell cars.

This course assists students to develop an array of specific skills including: applying the engineering design process to a specific problem; working effectively and collaboratively with other members of the class; demonstrating originality and inventiveness in your work; reflecting critically in order to improve creative efforts in problem solving; and viewing success as a cyclical process. Through active problem solving in the context of specific case studies, this course addresses concepts and skills relevant to a career in engineering. A culminating project requires students to apply much of what they have learned in the course.

**Marine Science**

*Prerequisite: Successful completion of one year of high school laboratory science or permission from the administration*

*Offered: Co-ed*

Marine Science introduces students to oceanography through a review of earth science concepts, investigation of physical and chemical ocean systems, and the exploration of marine organisms. Major topics of study include the anatomy and behavior of marine organisms, the ecology of marine habitats, and the role of climate change in both marine and global systems. Students develop a solid knowledge base and understanding of marine ecological systems; integrate that knowledge base into practical applications of science that affect students' world and futures; and, perhaps most importantly, foster critical thinking skills and a keen understanding of the scientific process necessary to become well-informed and scientifically aware citizens, whether students' futures directly involve marine science or not. Coursework includes virtual and at-home laboratory exercises; scientific literature analysis; reading and video assignments; and research using online journals and current oceanographic data. This work is largely collaborative as students engage with the teacher and with their classmates on projects and labs. There is a significant emphasis on the application of creativity and innovation in dealing with environmental challenges.

**Neuroscience**

*Prerequisite: Successful completion of one year of high school laboratory science or permission from the administration*

*Offered: Girls and Co-ed*

A spongy, three-pound mass of tissue -- the brain -- controls every aspect of the body, ranging from circulation and appetite to emotion and memory. Because the brain shapes our thoughts, beliefs, hopes, dreams, and imaginations, the brain is what makes us human. By the end of the first semester, students understand the structure of the brain and how the brain senses, thinks, behaves, and creates memories for learning and language, as well as how the environment (stress, diet, exercise and time) impacts the brain. We also explore brain diseases, disorders, and treatments. Armed with this solid foundation in neuroscience, students spend the second semester learning to think like doctors. In this project-based class, students engage in individual research projects and seminar-style problem solving. Utilizing neuroscience as a foundation to explore any human biology topic, students are guided through a self-designed, long-term research project. This course is designed for students who are considering college majors in a medical or health related field, such as medicine, psychology, occupational therapy, neural or biomedical engineering, public health, lab neurobiology research, radiology or imaging, speech-language pathology, or kinesiology.

## Social Science Courses

**AP® Art History**

**Art History**

*Prerequisite: Successful completion of one year of high school history*

*Offered: Girls and Co-ed*

Students enrolled in the AP® Art History course examine and critically analyze major forms of artistic expression from a variety of cultures spanning 32,000 years of art. Beginning with global prehistory and ending with global contemporary art, students consider influential forces like patronage, politics, class, belief, gender, and ethnicity in their analysis of art forms. Students become active participants in the global art world, engaging with its forms and content, as they experience, research, discuss, read, and write about art, artists, art making, and responses to and interpretations of art. By investigating a specific image set of 250 works of art characterized by diverse artistic traditions from prehistory to the present, the course fosters an in-depth, holistic understanding of the history of art from a global perspective. Students may select the AP® or non-AP® track in this course. AP® students are expected to delve deeper into the topics, take AP®-style assessments, and prepare for the AP® exam in the spring.

**AP® Human Geography**
*Prerequisite: Successful completion of one year of high school history*
*Offered: Co-ed*
AP® Human Geography introduces students to the systematic study of patterns and processes that have shaped human understanding, use, and alteration of Earth's surface. Students employ spatial concepts and landscape analysis to examine human social organization and its environmental consequences. Students analyze the interplay between geography and humanity while they investigate topics such as population growth and migration; cultural patterns and processes; political organization of space; agriculture; industrialization and economic development; cities and urban land use; and the environmental impact of human actions. They learn about the methods and tools geographers use in their science and practice, which help geographers answer such diverse questions as: What do clustering patterns of voting districts in a state tell one about the population? Why do most North Americans practice Christianity? And, what has changed in the last ten years that has caused the oil industry to not be able to keep up with demand? The course includes discussions, collaborative projects, free-response questions and traditional tests and quizzes. Students taking this course are well prepared for the AP® Human Geography Exam in May.

**AP® Macroeconomics**
*Prerequisite: Successful completion of Algebra II*
*Offered: Girls and Co-ed*
AP® Macroeconomics introduces students to major economic issues such as basic market analysis, the causes of the cycle of economic growth and recession, the problems of inflation and unemployment, the causes and consequences of federal budget deficits, and the causes and effects of international trade imbalances and currency fluctuations. Students analyze the impact of fiscal and monetary policies as well as the debates surrounding the implementation of each. This course involves extensive reading, problem-solving exercises, online discussions, and research and writing about contemporary macroeconomic issues. Multiple modalities are employed for content presentation so as to encourage personalization; assessment evaluates each student's ability to utilize skill sets related to economic decision making. Strong reading, algebra, and analytical skills are necessary for success, as is strong motivation. AP® Macroeconomics prepares students to become informed and thoughtful and thoroughly prepare students to take the AP® exam in the spring. AP® Macroeconomics is recommended for juniors and seniors.

**AP® Microeconomics**
*Prerequisite: Successful completion of Algebra II*
*Offered: Girls and Co-ed*
AP® Microeconomics is a course that examines how individuals (such as consumers and producers) make decisions and how these decisions affect our everyday lives. Topics discussed include the forces of supply and demand, costs of production, consumer choice, and behavioral economics, amongst others. Throughout the course, students examine various models that are used to conceptualize how our economy operates and explore the role that government plays in a given economy. As an online, college-level course, significant emphasis is placed on independent work and individual accountability. Students complete collaborative projects, group discussions, problem sets, quizzes, and tests. The curriculum is developed to prepare students for the AP® Microeconomics examination in May. Strong mathematical reasoning skills and an interest in finance, business, or government aid students in this course. AP® Microeconomics is recommended for juniors and seniors.

**AP® Psychology**
**Psychology**
*Prerequisite: Successful completion of eighth grade*
*Offered: Girls and Co-ed*
AP® Psychology and Psychology introduces students to the systematic and scientific study of the behavior and mental processes of human beings and other animals. In this course, students are presented with the psychological facts, principles and phenomena contained within the major branches of psychology. The course includes a balanced examination of: Biological Bases of Behavior, Sensation and Perception, States of Consciousness, Learning, Cognition, Motivation and Emotion, Developmental Psychology, Personality, Testing and Individual Differences, Abnormal Psychology, Treatment of Psychological Disorders and Social Psychology. Students develop a thorough understanding of the many subfields contained within psychology and the connections between them. In addition, students are also exposed to the history, methodology and

ethical practices associated with psychological research. Upon completion of this course students recognize the significance of psychology and it practical applications upon the world around them. Students engage collaboratively with their classmates in projects and real-world discussions. Students may select the AP® or non- AP® track in this course. AP® students are expected to delve deeper into the topics, take AP®-style assessments, and prepare for the AP® exam in the spring. Non-AP® students demonstrate mastery through projects and alternative assessments.

**AP® US Government & Politics and AP® Comparative Government & Politics**

*Prerequisite: Successful completion of one year of high school history*

*Offered: Girls and Co-ed*

This yearlong course provides students with an in-depth understanding of the American government as well as various political systems around the world by covering two AP® curricula. The fall semester covers AP® US Government and Politics. Students learn how the American government was founded, how the electoral process works, who votes and why, and how the various branches function. Special attention is given to how the different agencies within the government interact, and how these agencies and their policies affect the daily lives of Americans. The spring semester covers AP® Comparative Government and Politics, which takes an in-depth look at six different states: Iran, Nigeria, China, Russia, Mexico, and Great Britain. In addition to learning how to conduct proper comparative studies, students analyze how these different states function, both as independent states and as part of the global community. Upon completion of this course, students have a thorough understanding of some of the major political systems across the world, which makes it easier to comprehend how our world evolves and functions. Students are prepared for both AP® exams.

**Civics, Culture, and Intersectionality**

*Prerequisite: Successful completion of one year of high school history or permission from the administration*

*Offered: Co-ed*

What are the rights and duties of each citizen? How does culture influence social and political beliefs? This course builds competency around the intersections of civics and culture, and gives students the space to articulate their own beliefs. Through the lenses of civics, culture, race, class, religion, and art, we explore citizenship and justice. As we define what we believe, we uncover our own biases; explore the difference between fact and opinion; practice empathy; and learn to voice our own perspectives without silencing those of others. We tackle the challenges that disenfranchised people face today, how political and historical factors have shaped extremists' responses to our challenges, the role of culture in how challenges are addressed, and what we, as responsible citizens, should do. Both the students and the teacher provide topics for class discussions, and students develop competencies in current events analysis, research, writing, and discussion.

**Gender and Sexual Identity in America**

*Prerequisite: Successful completion of one year of high school history or permission from the administration*

*Offered: Co-ed*

What is the role of gender and sexuality in identity formation? How has historical climate affected the identity expression of LGBTQ Americans? This course opens with an examination of historic roots of gender and sexuality identity in America, starting at the end of the nineteenth century and continuing through present day. The course focuses on the changing nature of identities over time, including efforts to expand and restrict identities in cultural, religious, and political forms. With this historical foundation, students work individually and collaboratively on research initiatives in the second semester, in topics of their choosing, such as gay marriage, gender reassignment, reproductive rights, workplace discrimination, HIV/AIDS, heteronormativity, etc. This course offers students the opportunity to both develop cultural competency around gender and sexual identity, and explore their own interests on a wide range of related topics.

**Independent Study**

*Prerequisite: Recommendation from a school administrator at a student's permanent school and permission from the One Schoolhouse administration*

*Offered: Girls, Co-ed, or Boys*

Want to take a deep dive into your favorite subject but need some teacher support? One Schoolhouse arranges for a facilitator for this year-long, student-designed independent study in a core or elective subject. The teacher and student work collaboratively to design a syllabus, establish pacing, and determine metrics by which progress is measured. The student produces a culminating portfolio, which might include exemplars of content and skills mastery as well as a capstone

independent research. Please contact Corinne Dedini at corinne.dedini@oneschoolhouse.org for more information on independent studies through One Schoolhouse.