

Full-year courses

Ancient & Classical Civilizations

Ancient Civilizations will be an inquiry-based, in-depth course that will offer students an opportunity to investigate the history of the ancient world's major cultures from their beginning to their decline in the post-classical era from an interdisciplinary perspective. Offered as an elective option aimed at 9th and 10th graders to complete their 4th social studies credit, the course will serve as a foundational course that purports to introduce students to research and analytical skills needed in the upper level courses.

In terms of content, the course will explore the increasingly interconnected history of major civilizations and other forms of complex societies that arose in pre-classical through post-classical era Afro-Eurasia, focusing on comparative analysis of the sociopolitical, economic, religious, and cultural traditions and innovations that developed in these ancient societies as well as the webs of communication and exchange that connected these societies spatially and temporally. Investigations of cultural traditions will emphasize the development of scientific and technological breakthroughs and innovations, trace the means and routes by which they spread beyond the society in which they emerged, and the regional and cross-regional impact they wielded on the increasingly interconnected pre-modern world. In specific terms, the civilizations studied in the course will range from Mesopotamia and Egypt in the ancient world, to Greece, Rome, Persia, China, and India in the classical world, to the fall of Rome and the rise of the Islamic world in the early-post-classical world.

As a foundational course focusing on inquiry learning and the development of higher order thinking, reading, and writing skills, a heavy emphasis will be based on analyzing and evaluating various types of primary and secondary sources. The course will culminate with a final research project that will integrate these skills and focus on the larger themes of the course.

Chemistry

Chemistry 1 focuses on investigating the world of matter and energy through critical inquiry, problem solving, and research. Due to its enabling roles in fields from the life sciences and agriculture to engineering, materials science, and nanotechnology, chemistry is often regarded as the central science. This unique centrality is emphasized through class dialogue, activities, and laboratory experiments in which students observe and analyze chemical systems in order to bolster conceptual understanding. As fundamentals are developed, students continue to deepen their grasp of the molecular basis of macroscopic properties and phenomena and examine principles and questions of increasing complexity. Upon completion of Chemistry 1, students will take the Virginia Chemistry standards of learning end-of-course test.

Computer Science

Students are introduced to the academic discipline of computer science with emphasis on problem solving using the current College Board computer language. At this time, the language is Java. The course introduces Object Oriented Programming (OOP) and uses an Objects first approach. Skills in defining, writing, and running computer programs on a windows based networked personal computer are developed. Students work with both mathematical and non-mathematical problems. Students will also be introduced to computer graphics, Graphical User Interfaces (GUI), data storage and data processing, boolean algebra, and computer number systems. No prior computer knowledge is needed.

This course is usually offered during summer school and as summer self-study for those students who wish to place out of this introductory course and begin their computer science studies with Advanced Placement Computer Science.

Semester Courses

20th Century World History

Twentieth-Century World History is a concise, truly global survey of the period from 1885 (Berlin Conference) to the fall of communism in the late 1980s. The course is devoted to crises in Europe from 1914 to 1939; the struggle against colonialism in Africa and Asia; World Wars I and II and the Cold war; the impact of revolution; and the growth of independence in Africa, Asia, and Latin America. Also included in the course of study are two case studies on the impact of technology on history and geography: the Panama Canal and the building of the Aswan Dam.

America and the World Since 1989

All too often, the forgotten part of history instruction is the history of our own lives. Students may be aware of great moments, events and trends from the Roman era, the Renaissance, and the Industrial Revolution but unaware or nominally aware of the end of the Cold War, the rise of the European Union or China as economic powers, or even domestic events such as the Republican Revolution. This course is designed to fill those gaps. While this is in large measure a history course, the curriculum may evolve depending on current events as they reflect trends of the last two decades. Nonetheless, subject areas will include the end of the Cold War and fall of the Soviet Union, the breakup and civil war in Yugoslavia, the rise of the European Union, China and East Asia as global powers, the rise of the left in Latin America, new developments in the Middle East, and politics in America in the 1980s and 1990s. The course will function as a readings seminar. In each unit, students will read, discuss, and present on articles from periodicals such as Current History, Foreign Affairs, Atlantic Monthly, and major newspapers. They will also spend a good deal of time simply becoming familiar with the geography of the areas to be studied, and the names of domestic and foreign leaders and thinkers.

TJ Math 5

The study of Advanced Functions includes an extension of topics first introduced in algebra. All parent function graphs and their transformations are a focus as well as the important features of graphs such as symmetry, concavity, extrema and end behavior. Operations on functions are studied, especially composition, and finding appropriate domains is stressed. Specific functions such as exponential and logarithmic are explored and used for graphing, solving equations, and applications. Other topics of study include sequences and series, proof by math induction, and the exploration of conic sections and their applications and an introduction to the fundamentals of calculus, including limits, continuity, and the concept of the derivative. The process standard focus will be Communication. Upon conclusion of TJ Math 5, students will be advised as to which level of AP Calculus they should take the following school year.

TJ Math 6

Semester introduction to calculus providing an overview of limits, derivatives, and applications related to those topics.

Research Statistics 1

Students study basic probability and statistics with an emphasis on applications to scientific research. Topics studied include combinatorics, probability, descriptive statistics, and statistical distributions. The course culminates with an introduction to inferential statistics and applications of t-tests. Use of technology is integrated throughout the course.