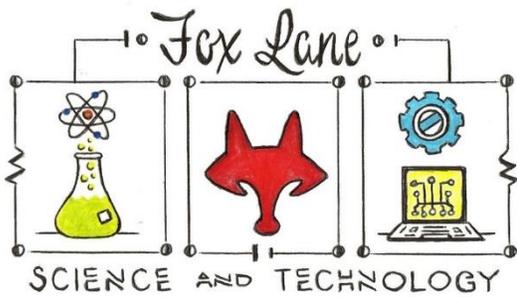


Course Offerings 2020-2021

9 th GRADE		
Core Courses	Electives (Taken in Combination with a Core Course)	
Living Environment Regents	Introduction to Engineering and Design **	
Living Earth Regents		
10 th GRADE		
Core Courses	Electives (Taken in Combination with a Core Course)	
Earth Science Regents	Introduction to Engineering and Design **	Animal Behavior (1/2 year)
Chemistry Regents	Principles of Engineering **	Anatomy & Physiology (1/2 year)
Chemistry Honors	Introduction to Science Research **	Computer Science
	Bioethics (1/2 year)	Intro to Computer Science (1/2 year)
11 th GRADE		
Core Courses	Electives (Taken in Combination with a Core Course)	
Earth Science Regents	Principles of Engineering **	Bioethics (1/2 year)
Applied Chemistry	Computer Integrated Manufacturing **	Animal Behavior (1/2 year)
Chemistry Regents	Introduction to Science Research **	Anatomy and Physiology (1/2/ year)
Chemistry Honors	Intermediate Science Research **	Astronomy (1/2 year)
Applied Physics	Forensic Science Honors **	Meteorology and Climate (1/2 year)
Physics Regents	Advanced Geology Honors **	Computer Science
Physics with AP Science	AP Chemistry **	Intro to Computer Science (1/2 year)
	AP Physics **	AP Computer Science **
	AP Biology **	AP Computer Science Principles **
	AP Environmental Science **	
12 th GRADE		
Any of the following courses are available to senior students that have successfully completed three core courses.		
Earth Science Regents	AP Environmental Science **	Anatomy and Physiology (1/2/ year)
Applied Chemistry	Advanced Geology Honors **	Astronomy (1/2 year)
Chemistry Regents	Forensic Science Honors **	Meteorology and Climate (1/2 year)
AP Chemistry **	Principles of Engineering **	AP Computer Science **
Applied Physics	Computer Integrated Manufacturing **	AP Computer Science Principles **
Physics Regents	Engineering Design and Development **	Computer Science
Physics with AP Science	Advanced Science Research **	Intro to Computer Science (1/2 year)
AP Physics **	Bioethics (1/2 year)	
AP Biology **	Animal Behavior (1/2 year)	

A three-year sequence of core science courses is required for graduation from Fox Lane High School. Please check individual course prerequisites as certain courses may require prior coursework, teacher recommendation or approval of the department coordinator. Students may enroll in multiple core science courses concurrently with approval.

** Science/Technology courses that have the potential to earn college credit. **



Life Sciences

Living Environment Regents:

Living Environment at Fox Lane High School is a full year course open to 9th-12th graders interested in Biology. The course follows the New York State P-12 science learning standards, while offering a comprehensive study of how organisms' function and interact with each other and their environment. The course has a mandatory laboratory component that includes data collection and in-depth analysis. Content is presented in a variety of ways, including relevant, problem-based learning units. This format lends itself to active and worthwhile classroom discussions and promotes highly developed student work. Successful completion of the Living Environment course and Regents exam is a prerequisite for many other courses in Science and Technology.

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:
Prerequisites: None Target Audience: 9 grade students.

Suggested Guidelines: Students that succeed in Living Environment are those that attend class regularly and are able to manage daily homework (10-15 minutes per night) while completing the mandatory NYS requirement of 20 laboratory experiences and corresponding lab reports/write-ups.

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Living Earth:

The Living Earth course is an option for students to take in place of Living Environment. The Living Earth Course will appeal to students interested in authentic environmental problems ranging from local issues to global challenges. This course is problem-based and interdisciplinary – emphasizing the intersection of Earth science and Life science concepts and themes while preparing students to take the Living Environment Regents exam *only*. Units are designed around problems (i.e. Cancer, Global Warming, etc.) rather than content topics (i.e. Evolution, Ecology, etc.). Successful completion of the Living Earth course and the Living Environment Regents exam is a prerequisite for many other courses in Science & Technology.

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:
Prerequisites: None Target Audience: 9 grade students.

Suggested Guidelines: Students that typically have success in this course are: Deeply interested in science concepts/experimentation. Comfortable drawing connections between new information that is introduced in a non-linear or spiraling format. Self-motivated, and capable of managing open-ended projects while also completing the mandatory NYS requirement of 20 laboratory experiences and corresponding lab reports/write-ups.

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AP Biology:

AP Biology is an introductory, college-level course in biology. Students gain enduring understandings of biological concepts and the scientific evidence that supports them. This course provides a solid basis for further study of biology in college; students feel very well prepared for these college courses. Inquiry-style laboratory experiences help students model the behavior of scientists at work. Units of study include Biochemistry, Cells, Cellular Communication, Bioenergetics, Heredity, Molecular Genetics, Evolution and Ecology. This course culminates in the AP Exam in May and a dissection lab practicum investigating mammal anatomy and physiology.

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:
Prerequisites: Successful completion of 2-3 full year science courses Target Audience: 11-12 grade students.

Suggested Guidelines: Recent revisions (August 2019) by The College Board has reduced the breadth of topics covered in AP Biology, which has reduced the pace somewhat. The workload includes reading with in-depth analysis questions and labs. Students are expected to complete a manageable summer assignment and there are assignments to be completed during the Winter, February and Spring Breaks. There is a considerable lab component where students work collaboratively to design and implement experiments. Introductory statistical data analysis is covered to help students interpret their experimental findings. Prerequisite math skills include the ability to calculate percentages, averages and unit conversions. Students who typically perform well, without undue stress, are *conscientious* students with a keen interest in biology who can *write coherently and thoroughly* and who can *manage their time well*. Reliable predictors of success are: Chemistry Regents (90 or above), Geometry and Algebra II (85 or above).

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Anatomy and Physiology:

Are you considering a possible career in nursing, medicine, nutrition, veterinarian medicine, exercise physiology or medical technology? If you are interested in knowing how the human body works, then this is the course for you. TED talks, animations and medical mysteries are some of the captivating ways that the body systems are investigated. Medical case studies are used to emphasize clinical applications and disease conditions. Units of study include an introductory unit on how the human body is organized followed by the endocrine system, the cardiovascular system (broken into studies of blood, the heart and the blood vessels); and the digestive system with a focus on the human microbiome. This half year, non-lab course culminates in a final exam.

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:
Prerequisites: Successful completion of 1-2 full year science courses. Target Audience: 10-12 grade students.

Suggested Guidelines: A&P examines several human body systems with an emphasis on depth of understanding rather than on breadth of many body systems. Activity lists guide students through the workload with the expectation that students are devoting a manageable amount of time (averaging 10 - 15 minutes/day), outside the classroom, to complete reading and analysis questions. Answer keys are provided to students to check their work. Students who perform well are those who have a *solid work ethic* and a *genuine interest* in learning about the human body. Reliable predictors of success are: Chemistry Regents (80 or above), Living Environment Regents (80 or above), Geometry and/or Algebra II (80 or above).

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Animal Behavior:

Have you ever wondered why dogs are referred to as “Man’s best friend?” Are you considering becoming a veterinarian? Do you love working with animals? From insects to reptiles, birds, and mammals - Animal Behavior is a ½ year, non-lab, introductory course that probes to answer how animals think and learn. Animal Behavior takes a close look at how a broad spectrum of species from the animal kingdom are uniquely adapted to survive in their environments. Students investigate patterns of behavior by examining topics ranging from communication and intelligence; predator-prey and symbiotic relationships; to parental care and social bonding. The course will include projects such as raising and training chickens through classical and operant conditioning, along with guest speakers and field work in conjunction with West Moreland Sanctuary.

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:
Prerequisites: Successful completion of Living Environment or Living Earth Target Audience: 10-12 grade students.

Suggested Guidelines: The Animal Behavior course is offered as an opportunity for students with diverse academic abilities to investigate how animals think and learn by exploring the science of behavior and combining it with individual and group reflections on how to interpret those behaviors. Students taking the course should have taken and possess a basic understanding of topics covered in the Living Environment course (Evolution, Basic Physiology, and Ecology). Course assessments include a broad range of activities such as individual and group projects, debates, along with reflection/journal assignments. A reliable predictor for success is the Living Environment Regents exam (75 or higher). [BACK TO TOP](#)

Bioethics:

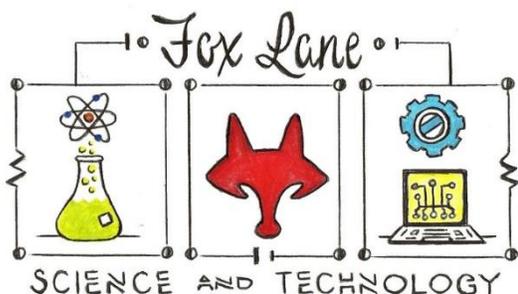
Many of the current moral issues have their foundation in technology therefore it is necessary that we focus our attention on bioethics. Bioethics is an interdisciplinary subject that intersects the life sciences, ethics and society. This course will investigate the history of bioethics and will focus on the legal, moral and ethical dilemmas that have been created by advances in science and technology. Our society, including our legal system, has not been able to keep pace with these changes. What was once black and white has now become a large gray area in decision making. The purpose of this course is to get students to think critically and effectively. Students will be taught HOW to think rather than WHAT to think. The format of the course will be based on a case study approach to investigate current bioethical dilemmas.

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:
Prerequisites: Successful completion of Living Environment or Living Earth Target Audience: 10-12 grade students.

Suggested Guidelines: Students who typically find success in this course are:

1) Comfortable speaking in class or willing to expand their comfort-level with doing so. Students are regularly asked to participate in small and large group discussions, present in class, and engage in debates. 2) Comfortable expressing their thoughts in writing. Students are required to keep a journal to chronicle their thoughts on debated issues. 3) Capable of maturely discussing topics that may be considered controversial. The topics discussed in this class can be of a sensitive nature at times. Students must be willing to hear multiple perspectives and capable of mature discussion with other students who have different opinions.

The workload in this course is not as substantial as for some other science courses, and the topics discussed are not necessarily as complicated when it comes to the scientific principles. It is, however, extremely complicated with regard to the thought process. The course requires students to have an open mind, to think critically about the topic, and to be able to articulate their thoughts and opinions. This class is designed for thinkers; students who can apply biological, psychological, cultural, and ethical concepts to a given scenario. [BACK TO TOP](#)



Geosciences

Earth Science Regents:

The study of earth science incorporates several disciplines including geology, astronomy, meteorology, and oceanography. The students will investigate and discuss relevant topics in earth science while using hands-on experiments in the lab to complement our class work. Some of these lab experiences include the use of our school planetarium, creating river systems in stream tables, observing and recording weather data, identifying rocks and minerals, and calculating the epicenter of an earthquake.

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:

Prerequisites: None Target Audience: 10-12 grade students.

Suggested Guidelines: This course is well suited for students that have completed Living Environment and are interested in learning more about the physical template of the natural environment. There is little memorization in this course, but a strong emphasis on conceptual learning and three-dimensional thinking. It is a good option for students that struggle with math but are interested in a comprehensive Regents-level science course as the math calculations required are limited to basic algebraic functions. Students that do well in this course are able to interpret charts, graphs and complete multi-step problems. [BACK TO TOP](#)

Astronomy:

During this half year course, students will be able to apply knowledge of observational astronomy. This course will focus on the exciting NASA discoveries of the past few years and the future of the space program. Students will have the opportunity to use a new generation solar telescope and participate in evening star parties using telescopes at Pound Ridge Reservation. With the use of these telescopes, students can observe stars, star clusters, planets and their moons, nebulae, and galaxies. Students will investigate how astronomers interpret the light received from distant celestial objects; the Sun as a typical star and how its future will affect ours; and our modern understanding of how stars work and how they change with time. We will discuss, in detail, our solar system and the discovery of exoplanets. Students will have the opportunity to participate in a mock mission to Mars or the Moon at The Challenger Space Center.

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:

Prerequisites: Successful completion of 2-3 full year science courses. Target Audience: 11-12 grade students.

Suggested Guidelines: The course is designed for any student that has a particular interest in the solar system, planets, stars, and space exploration. Students that have not previously taken Earth Science are particularly encouraged. Students should be comfortable with abstract concepts while also possessing the skills required to manage the multiple individual and group projects that serve as assessments for the course (organization, time management, and independence). Previous coursework and experience with algebraic equations/conversions and geometrical applications are a plus. A reliable predictor for success in this class is Earth Science (85 or higher). This elective course should not be used to fulfill a science credit for graduation. [BACK TO TOP](#)

Meteorology and Climate:

During this half year course, students will be able to apply knowledge of atmospheric trends to solve a variety of problems and create inferences to future weather and climate events. Students will investigate various types of severe weather and how they impact human lives. Students will also examine factors that have influenced climate change in the Earth's past and discuss the likelihood of future climate change. There is an opportunity for students to participate in a hiking trip to Westmoreland Sanctuary to learn how climate change has played a role in our local environment.

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:

Prerequisites: Successful completion of 2-3 full year science courses. Target Audience: 11-12 grade students.

Suggested Guidelines: The course is designed for any student that has a particular interest in weather and climate (patterns, changes, etc.). Students that have not previously taken Earth Science are particularly encouraged. Students should be comfortable with analyzing charts, graphs, and maps while also capable of managing the multiple individual and group projects that serve as assessments for the course. A good predictor for success in this class is Living Environment (85 or higher). This elective course should not be used to fulfill a science credit for graduation. [BACK TO TOP](#)

Advanced Geology:

Students enrolled in Advanced Physical Geology will explore how the Earth works and why a comprehensive understanding of the Earth is critical to effectively managing the many environmental issues facing our world today. This lab-based course offers a strong focus on the unifying concept of plate tectonics including earthquakes, volcanoes and mountain-building as well as mineral resources, groundwater contamination and surface processes. Advanced Physical Geology is a dual-credit course that allows students the opportunity to earn 4 credits through SUNY Oneonta. In addition, students immerse themselves in a culminating independent research project during the final 4 weeks of the school year.

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:

Prerequisites: Successful completion of 2-3 full year science courses. Target Audience: 11-12 grade students.

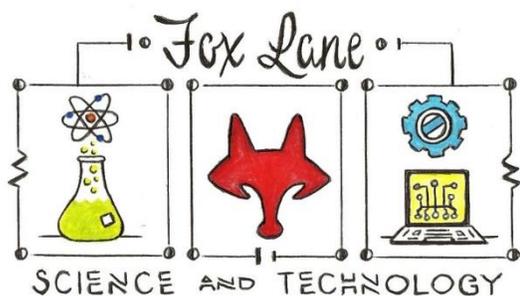
Suggested Guidelines: Students that do well in this class have a genuine passion for the natural environment. The math component of this class is not rigorous however, students that excel in this course are conscientious, willing to work independently and are critical thinkers. The course operates at a high academic rigor but at a moderate pace. Students can register as a non-matriculated, Spring Semester student at SUNY Oneonta to gain 4 college credits for this science lab course. Two reliable predictors for success in this class are Earth Science Regents (85 or higher) and Chemistry Regents (80 or higher). Students that did not take Earth Science are encouraged to take this course. [BACK TO TOP](#)

AP Environmental Science:

Environmental concerns plague our growing population, but knowledge is the key to living healthy, productive and sustainable lives. If you want to understand the complex science behind the environmental challenges facing our world and investigate new and evolving solutions, AP Environmental Science may be the course for you. The AP Environmental Science course is an integrated multidisciplinary capstone course for students interested in understanding the complex nature of environmental problems. Topics of study include a broad range of integrated disciplines ranging from environmental ethics, politics, economics, and law to forestry, ecology, evolution, agriculture, pollution, toxicology, and energy. The course is designed with a strong laboratory component including several opportunities for field investigation throughout the year. Opportunities for open-minded discussion and a respectful exchange of ideas permeate an evidence-based approach to evaluating the scientific principles and concepts of environmental science. The course culminates with a cumulative final exam and the AP Examination in May.

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:
Prerequisites: Successful completion of 2-3 full year science courses. Target Audience: 11-12 grade students.

Suggested Guidelines: Students that typically do well in this course are conscientious, able to manage a consistent workload, comfortable expressing themselves in written form, with a love for the natural world and solving problems. Tests are lengthy and challenging. While math calculations permeate the course, they are mostly limited to algebraic equations including unit conversions, percent change, dimensional analysis, linear/exponential relationships, and scientific notation. Students are expected to complete a summer assignment as well as independent manageable assignments to be completed during the Winter, February and Spring Breaks. Two reliable predictors for success in this class are Chemistry (80 or higher) and English (90 or higher). Students should have taken any two of the following prior to enrolling: Living Environment, Earth Science, and/or Chemistry. [BACK TO TOP](#)



Chemistry

Applied Chemistry:

Would humans be where they are today without chemistry? In this chemistry course we will explore the essential concepts of chemistry as we work to understand how it drives the world around us. In this course we will walk through history from the early discoveries of ancient alchemists to the latest cutting-edge discoveries in materials science that are driving interstellar exploration. We will focus on real world applications of chemistry with lab activities and experiences that will put us front and center to understand why things happen the way they do. Roll up your sleeves and get ready to delve into the depths of matter and energy!

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:
Prerequisites: None Target Audience: 11-12 grade students.

Suggested Guidelines: Chemistry in the Community focuses on real world applications of chemistry and provides students with experiences that help them understand the underlying nature of matter and energy. The course consists mainly of hands-on projects and experiments with an occasional quiz or ticket to leave. Students who have not taken chemistry and have struggled in previous Regents classes are encouraged to enroll. There is no mandatory lab component or Regents exam affiliated with this course. [BACK TO TOP](#)

Chemistry Regents:

Everything you can touch, taste, or smell is a chemical. The study of Chemistry helps us understand the natural world and has allowed the human race to achieve unbelievable feats. Chemistry is the explanation for everyday things like why laundry detergent works better in hot water or why simple ingredients can radically alter texture and flavors of your favorite foods. Even our existence is the result of a delicate balance of chemical reactions. Throughout the duration of this course, instruction will focus on the development of scientific ideas, the nature of science and the direct implications of chemistry has on our lives. The topics covered include: matter and energy, atomic structure, bonding, the periodic table, mathematics of chemistry, kinetics and equilibrium, acids and bases, reduction oxidation reactions, nuclear chemistry and organic chemistry.

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:
Prerequisites: None Target Audience: 10-12 grade students.

Suggested Guidelines: Students that typically do well in this course are self-motivated, able to manage a moderate workload, comfortable with mathematical relationships, and have good organizational skills. Chemistry is more abstract than Living Environment and demands an ability to visualize complex interactions on a molecular level. Test questions may require students to be able to draw connections between multiple concepts/units. While math calculations permeate the course, they are mostly limited to algebraic equations including unit conversions, percent change, dimensional analysis, linear/exponential relationships, and scientific notation. Students who are taking Algebra 2A concurrently with Regents Chemistry may experience difficulty attempting to master the math and chemistry concepts simultaneously. Algebra 2R or higher is a suggested co-enrolled course. A reliable predictor for success in this class is the Living Environment Regents Exam (75 or higher). [BACK TO TOP](#)

Chemistry Honors:

Why do you use soap to clean your hands? Why do you feel cold when you get out of a pool? How do fireworks produce such great colors? These are some of the many questions that we will explore in Honors Chemistry. Honors Chemistry is the study of the atoms and molecules that are the building blocks of our universe. Understanding how molecules form and how they interact with one another will help us understand and explain many of the observations in our daily lives. Chemistry is a lab based science. While we will be exploring similar topics to those covered in Regents Chemistry, we will be doing so in more depth and at a faster pace. This will require you to be self-motivated and committed. This class is meant for students with a strong science and math background and interest.

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:
Prerequisites: None Target Audience: 10th grade students.

Suggested Guidelines: Students that typically do well in this course are self-motivated, conscientious, able to manage a consistent workload, have good time management skills and are comfortable with mathematical relationships. To be successful you should expect to spend about 30 to 45 minutes a day on Honors Chemistry homework assignments and studying. Tests are lengthy, challenging, and involve the application of knowledge in multistep processes. Three reliable predictors for success in this class are achieving a 90 or better in Living Environment, and an 88 or better in Algebra I, and Geometry. Students may take this class concurrently with Geometry, but prior successful completion of Geometry may of benefit by providing more developed problem-solving skills. It is important to note that this is the first accelerated/honors course offered in science. When comparing this course to Living Environment (9th grade experience) understand that, there is more homework, lab assignments are more data-driven and inquiry-based, and there is an elevated expectation that students are reflective, self-motivated, independent, and able and willing to access resources on their own to self-correct. [BACK TO TOP](#)

AP Chemistry:

AP Chemistry is offered as a second-year college-level chemistry course. The majority of students will have taken Regents or Honors chemistry prior to taking AP chemistry. AP chemistry uses a double period weekly for laboratory investigations. The course is very dependent on solving equations. Students who are hard-working that feel an intrinsic satisfaction for learning difficult concepts will appreciate the rigor of this course. This is a college level, general chemistry course. Topics include chemical bonding, stoichiometry, states of matter, principles of thermodynamics, chemical kinetics, equilibrium, electrochemistry, qualitative and quantitative analysis, nuclear structure and radioactivity. The course culminates with a demanding final exam *and* the AP Chemistry test in May.

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:
Prerequisites: None Target Audience: 11-12 grade students.

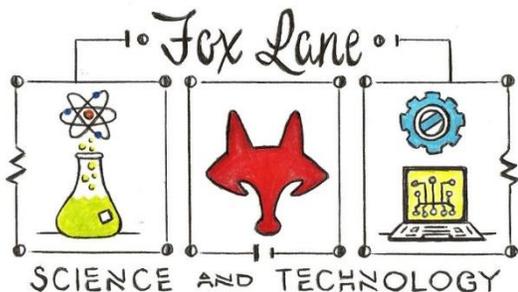
Suggested Guidelines: To enroll in AP Chemistry students typically have completed one year of Honors or Regents chemistry. A less common approach is successful completion of a chemistry summer class and/or achieving 90 or higher on a placement test designed from old Regents exams. The placement test is given in August and must be scheduled by the student with the department coordinator. Students that do well are highly motivated, eager to be challenged, and have a strong sense of self-satisfaction when performing well. This course is more rigorous than introductory Chemistry courses. One predictor of student success in this class is an 85 or higher on the Chemistry Regents Exam. [BACK TO TOP](#)

Forensic Science:

SUPA Forensic Science is a college bearing, non-lab based science elective. The course has been designed for high school seniors looking to challenge themselves prior to the rigors of the full time college experience. The primary focus of this course is to study the many ways in which science assists the criminal justice system in maintaining order within our society. Topics discussed include: the basics of the criminal justice system, crime scene investigation, DNA analysis, fingerprint analysis, Forensic psychology, blood stain pattern analysis, handwriting analysis, forensic pathology, and many other areas of forensic science. Students taking this course can expect to perform hands-on activities, conduct research, investigate case studies, and engage in class discussions and presentations. Examples of activities include an in depth investigation into the O.J. Simpson murder trial, a virtual autopsy, enhancing latent fingerprints lab, blood stain pattern analysis lab, forensic anthropology lab, and guest speakers in relevant fields of forensic science and law. Past student surveys for this course have indicated that students have generally had very positive experiences. They have reported that they have enjoyed the class, have felt more prepared for college, and they have, in most instances, walked into college with four college credits already under their belt. This class is a great way to get a taste of the college experience in the comforts of a familiar high school classroom.

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:
Prerequisites: Successful completion of Chemistry (R or H). Target Audience: 12 grade students.

Suggested Guidelines: This is a college level course. Students who typically do well in this course have been successful in both the Regents Chemistry course and the Chemistry Regents (70 or greater). The class requires independent learning through readings, case studies, research-projects and data analysis. A high degree of maturity is required due to the sensitive nature of the topics discussed i.e. sexual assault, homicide, drugs, serial killers, gory images and death. Students will be required to present projects as an individual and in groups. They should be comfortable speaking during class discussions. Assessments include high-stakes, college level exams encompassing multiple units. Students who are not self-driven, who are easily disturbed or typically do not engage in class discussion should not be recommended by this course. 11th graders must be concurrently enrolled in another core science course and should use Forensics to satisfy a graduation requirement. [BACK TO TOP](#)



Physics

Physics Regents:

Physics is the study of how matter and energy relate to each other, and how they affect each other over time and through space. This course will help students acquire factual knowledge within a conceptual and thematic framework, practice experimental design and interpretation, work collaboratively with other students in challenging labs, class activities and projects including the annual rubber-band powered car competition, and develop critical thinking skills. This is a rigorous course that requires a disciplined work ethic. The course culminates with a demanding NYS Regents Examination, which includes the completion of a minimum of 20 laboratory hours with written reports to the satisfaction of the instructor.

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:

Prerequisites: Algebra 2 or concurrent Target Audience: 11-12 grade students.

Suggested Guidelines: Regents Physics is a course that relies on abstract thinking and mathematical calculations. Reliable predictors of success: 80 or above on all Regents Science and Math examinations (particularly Chemistry, Algebra I, Algebra II, and Geometry). [BACK TO TOP](#)

Physics with AP Science:

This Physics course follows a demanding curriculum that will move at a rapid pace and requires a commitment to study at home on the part of the student. This course is for students who have a keen interest in studying science/engineering and may be thinking about pursuing those endeavors in college and who plan to enroll concurrently in an AP Science this year, and possibly enrolling in AP Physics the following year. This course will help students acquire factual knowledge and analytical skills within a conceptual and thematic framework, practice experimental design and interpretation, work collaboratively with other students in challenging labs, class activities and projects, and develop critical thinking skills. This course culminates with a demanding local final.

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:

Prerequisites: Chemistry & Algebra II Regents Exam (80 or higher); Co-requisites: AP science class & Precalc Target Audience: 11th grade students

Suggested Guidelines: Successful students are able to work independently and collaboratively, are organized, and are able to self-direct their study. Reliable predictors of success: 85 or above on all Regents Science/Math examinations and more reliably a pattern demonstrating the willingness to put the time into study and doing the necessary hard work. Pre-calculus or equivalent and an AP lab science class are co-requisites. [BACK TO TOP](#)

AP Physics:

AP Physics at Fox Lane is a demanding course matching a college level study of Physics with emphasis on Mechanics using experimental and mathematical modeling including the use of differential and integral calculus. Here at Fox Lane, AP Physics students develop a deep understanding of the foundation principles of classical mechanics. In addition, they will apply these foundation principles to complex lab and other thoughtful hands-on and minds-on scenarios that combine multiple aspects of physics rather than present concepts in isolation. AP Physics has the demands expected in a college course; however, it is enveloped with the support you expect at Fox Lane: quality instruction aware of diverse learning styles, support in class and after school, and communication with students and their parents. Students will culminate their experience by sitting for the AP Physics C test in Mechanics *and* an in-school final exam in May.

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:

Prerequisites: Physics or summer placement exam Target Audience: 11-12 grade students.

Suggested Guidelines: Students that typically do well in AP Physics are able to work independently and collaboratively, are organized, are able to self-direct their study, and understand that a significant amount of time should be expected for study. Reliable predictors of success: 85 or above on all Regents Science and Math examinations. But perhaps a more reliable predictor, a pattern demonstrating the willingness to put the time into study and doing the necessary hard work. Students should be concurrently enrolled in AP Calculus. Students enrolled in Pre-Calculus must get permission from instructor/department coordinator. [BACK TO TOP](#)

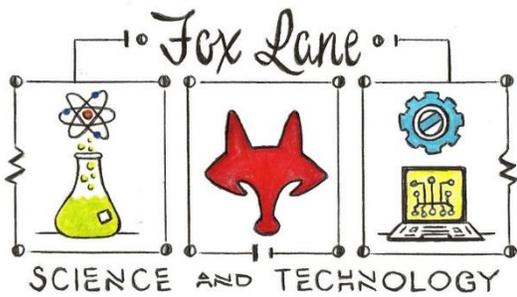
Applied Physics:

Students taking this course will develop an appreciation and understanding of physics and the scientific method by engaging in highly relevant problem-based learning. Units focus on a variety of topics including: the physics of driving, aerodynamics, and rocketry. Students will learn to solve problems using critical thinking skills they will need in the 'real world' beyond high school and they will come to recognize the benefits, as well as the limitations, of science and technology.

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:

Prerequisites: None Target Audience: 11-12 grade students.

Suggested Guidelines: Applied Physics is a class open to students of all ability levels that are interested in Physics and building. The course focuses on hands-on construction and how they relate to the practical/conceptual themes of physics. There is a lesser focus on mathematical calculations and applications than in other Physics courses. [BACK TO TOP](#)



Engineering

Introduction to Engineering and Design:

Have you ever wondered how to design something new or draw out an idea to show your friends? Stop wondering and do it! Introduction to Engineering Design students use AutoDesk Inventor, our state-of-the-art 3D design software, while discovering the role of an Engineer in taking an idea from the design process to product testing to manufacturing or production. You can even produce an incredible, working prototype of your project with our 3D printers and laser cutter! IED students work on projects, activities, and problems that are not only interesting, they also have direct global and human impacts. In IED you'll work in teams to design and improve products, document your solutions, and communicate your solutions to others.

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:
Prerequisites: None Target Audience: 9th grade students.

Suggested Guidelines: While mostly comprised of 9th grade students, this class is offered to any student who is interested in an introduction to engineering. This class meets the standards for the aesthetic credit required by NYSED but it should be noted that there is a significantly greater rigor to this course than other art and music courses. A reliable predictor for success in this class is the completion of advanced math in 8th grade. That said, a student need not be excluded due to a lack of math skills as IED has little math content; the indicator driven by the advanced 8th grade math is the ability to complete rigorous assignments in a fast-moving curriculum. Students who enjoy puzzles and problem solving are good candidates for IED. [BACK TO TOP](#)

Principles of Engineering:

Principles of Engineering is offered as our second-year course in Engineering. Taking the first-year course in the sequence, Introduction to Engineering Design, is not a prerequisite for this class. This course is designed to enhance general technological literacy and expose students to some of the major concepts they will encounter in a college engineering course of study. Students have an opportunity to investigate engineering and high-tech careers and to develop skills and understanding of engineering concepts. Students employ engineering and scientific principles in the solution of design problems. Students advance their problem-solving skills and apply their knowledge of research and design to create solutions to various challenges – including several different robot-building and programming challenges.

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:
Prerequisites: None Target Audience: 9-10 grade students.

Suggested Guidelines: This class is offered to any student in grades 10-12 interested in learning about engineering. IED is not a prerequisite, while many students who were successful in IED will find success in POE. For approximately half of the year, students will be working hands-on in small groups with VEX EDR robotics and programming using RobotC. One reliable predictor for success in this class is performing strongly in math and science classes. There is a fair amount of rigor to the course work. Successful students are those who like to work hands-on, enjoy solving problems, and are ready and willing to work inside and outside of the classroom. [BACK TO TOP](#)

Computer Integrated Manufacturing:

Do you want to learn how things are made in a large-scale manufacturing facility? How does a global shipping company sort and mail millions of packages? Is the process for making a water bottle the same as making a musical instrument? How are assembly lines designed and automated? Computer Integrated Manufacturing students grow their knowledge of the history, principles, and processes of manufacturing, then design and build their own automated manufacturing system while factoring in safety, quality, cost, and efficiency. CIM students use technologies in their projects that have revolutionized manufacturing: computer modeling, Computer Numeric Control or CNC technology, Computer Aided Manufacturing or CAM software, robotics, flexible manufacturing systems, 3D printers, and laser cutters. If you enjoy building and programming VEX robots, CIM is the class for you!

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:
Prerequisites: None Target Audience: 10-12 grade students.

Suggested Guidelines: This class is offered to students who have already completed POE and are ready for the next level of Engineering. One quarter of the year is devoted to building and programming robots made from the VEX robotics equipment introduced in the POE class. Students who are successful in CIM are those with an innate desire to solve problems. There are several open-ended activities wherein students may depend upon one another for technical assistance while everyone will be independently finding unique answers. As a result, the ability to work well in collaborative groups is also a key to success. [BACK TO TOP](#)

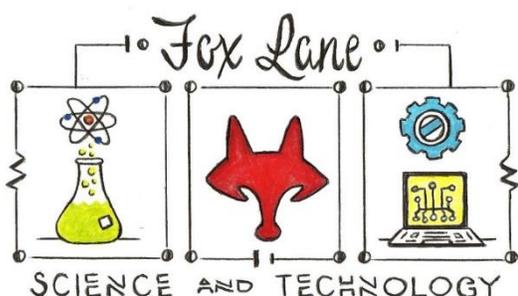
Engineering Design and Development:

Have you ever said: "Don't you hate it when...?" Here is your chance to do something about it! Working as part of a team, Engineering Design and Development students design solutions to a technical problem of their choosing. You'll be able to research, design, test, and construct a solution then present your design to industry partners. EDD students use what they have already learned in other Engineering classes to guide them through the process of design and product development. Who knows? You and your team might solve a real world problem that has stumped other engineers!

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:
Prerequisites: None Target Audience: 11-12 grade students.

Suggested Guidelines: This class is our capstone Engineering course. Students work in small groups on a self-selected, unique, real-world problems and spend the entire year carefully using the Engineering Design Process to solve their problem. Successful students are most often former engineering students who can self-guide through a complex long-term assignment. Student will keep fastidious patent-ready notes in an Engineering Notebook that is typically over 100 pages in length. Organizational skills and the ability to manage long open-ended projects are critical to success.

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Computer Science

Introduction to Computer Science:

This is an introductory half-year course in computer science and is intended for students having little to no background in the subject. It provides an overview of many aspects of computer science including programming robots, creating webpages in HTML, and basic concepts in coding. At the conclusion of this course, students will be prepared to take Computer Science or AP Computer Science Principles.

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:
Prerequisites: None Target Audience: 9-12 grade students.

Suggested Guidelines: This course is intended for any student in any grade with no prior experience in computer science. Students that typically find success in this course are active learners that enjoy problem solving and critical thinking. While no experience is necessary, an interest and curiosity about computers and/or programming is essential.

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Computer Science:

This is an introductory computer science class geared toward students that may have had some experience with coding in the past and are interested in learning how to develop and write their own code. Students are exposed to a variety of topics and programming languages including: hardware and software, coding games in JavaScript, the RobotBASIC programming language, Flash Software to make animations and games, and the Python programming language. At the conclusion of this course students will be prepared to take either AP Computer Science or AP Computer Science Principles.

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:
Prerequisites: None Target Audience: 9-12 grade students.

Suggested Guidelines: This course is a full year course for students that are eager to advance their knowledge of computer science with a particular focus on writing code. Students that typically find success in this course are active learners that enjoy problem solving and critical thinking. They enjoy challenging themselves by trying something new and are determined to complete what they start. While no experience is necessary, a desire and ambition to learn how to code are essential.

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AP Computer Science Principles:

This is a college level course that offers students the opportunity to gain exposure to computing and study its effects and integration into the real world. Students learn how computers work and function as a part of the internet, creative aspects of programming, abstractions, algorithms, large data sets, the Internet, cybersecurity concerns, and computing impacts. This course will help students develop a thorough grasp of the computing foundations and concepts relevant to college and careers that involve every field today. Multidisciplinary in nature, the course teaches students to analyze problems, use creative thinking, and collaborate to investigate solutions to real-world issues using computing. Students need to have strong communication and writing skills to be successful in the course. Students will be prepared to take the AP Computer Science Principles Exam in May which also includes a portfolio of projects submitted beforehand.

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:
Prerequisites: None. Target Audience: 10-12 grade students.

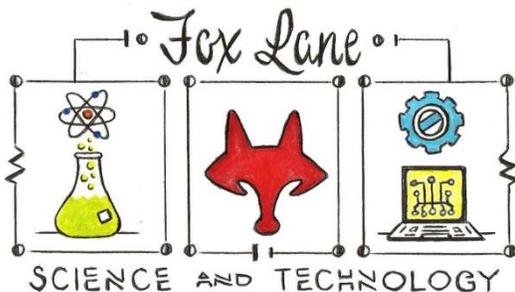
Suggested Guidelines: This course requires students to complete a wide range of tasks. While there is some coding, students also need to complete more traditional assignments. Students must be responsible and are expected to keep up with a wide range of assignments outside of class. Students that typically find success in this course have typically completed a prior course in computer science OR have a strong interest and desire to learn about computer science and coding. They can communicate well and have a strong work ethic. [BACK TO TOP](#)

AP Computer Science:

This is a rigorous course in coding and is equivalent to a one semester college level introductory course in computer science. Students learn to code using the Java programming language. Students will be prepared to take the AP Computer Science A exam in May. While not a requirement, it is strongly recommended that students complete a prior course in computer science. If a prior course is not completed, department approval is required. Topics include problem solving, design strategies and methodologies, organization of data (data structures), approaches to processing data (algorithms), analysis of potential solutions, and the ethical and social implications of computing.

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:
Prerequisites: Successful completion of prior computer science course or teacher approval. Target Audience: 11-12 grade students.

Suggested Guidelines: This is the highest-level course offered in computer science. To be successful, students must be strong problem solvers with a solid background in mathematics. It is a full year of coding taught at the college level. Students that typically find success in this course have a strong work ethic and desire to fully understand a concept before moving on. They enjoy solving difficult problems and take pride in their work. For those students without prior computer science experience at Fox Lane, they must meet with the instructor to get approval prior to enrolling in the class. [BACK TO TOP](#)



Science Research

Introduction to Science Research:

Want to make a difference in the world of science? Interested in pursuing a career in a STEM (science, technology, engineering, or mathematics) field? Or perhaps you'd like the opportunity to work with a leading scientist to research Alzheimer's disease, program a functional web application for Astrophysicists, identify the best treatments for certain types of cancer, or look into the impact of climate change on animal populations? Fox Lane High School Science Research is a 3-year program that allows students to independently pursue a topic of their own interest. Students will attend class periods that meet every other day and biweekly meetings with the Science Research teacher to set goals and monitor progress. Students will learn, use, and strengthen, skills in the areas of authentic research, time management, communication and public speaking, the presentation of research ideas, technical writing, graphic design, and more applicable to other subject areas. Students will also reach out to and connect with a professional scientist mentor in their field in order to conduct research over the summer. Students have been mentored at institutions such as NYU, Columbia, Yale, Harvard, New York Medical College, Mount Sinai, Albert Einstein College of Medicine, Rockefeller University, and many others. Starting the summer between sophomore and junior year, students are eligible to earn 2 college credits from SUNY Albany. Students who complete the 3-year program can graduate with a total of 12 college credits.

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:
Prerequisites: Parental and Instructor Permission, completion of summer assignment. Target Audience: 10-11 grade students.

Suggested Guidelines: Students that typically do well in this course are: self-motivated, perseverant, organized, able to manage a significant amount of independent work, have strong reading, writing, and communication skills, and are able to devote their summers to researching with a scientist mentor. Independent work towards understanding the science research topic is expected. Oral presentations and building on prior writing skills are large components of the course. Two reliable predictors for success in this class are 90 or higher in science classes and 90 or higher in English classes. Students should be entering 10th grade although 11th graders may join with permission of instructor. It is important to note that this course requires significant time outside of the school day and time over the summer for lab visits and/or fieldwork. [BACK TO TOP](#)

Intermediate Science Research:

Students who complete their first year of the Science Research Program move on to Intermediate Science Research. This is where all of the summer research comes together in the form of a research paper and poster which students then enter in local, regional, and international science competitions and symposia. With the guidance of the student's scientist mentor and Science Research teacher, students are prepared to present their research at events such as the Westchester-Rockland Junior Science and Humanities Symposium, the Westchester Science and Engineering Fair, the International Sustainable World, Energy, Engineering, and Environment Project Olympiad, and the international Genius Olympiad. Students

can qualify for elite events such as the Intel International Science and Engineering Fair, often referred to as the Olympics of Science. Our students have earned many awards, honors, and scholarships, and have even been invited to present their research at international conferences or been interviewed on the radio. Over the summer between junior and senior year, students will either conduct a study that they planned and developed during the school year. Students can earn a total of 6 college credits from SUNY Albany in the course of their junior year.

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:
Prerequisites: Intro to Science Research, completion of summer assignment. Target Audience: 11-12 grade students.

Suggested Guidelines: Students that typically do well in this course are: self-motivated, perseverant, organized, able to manage a significant amount of independent work, have strong reading, writing, and communication skills, and are able to devote their summers to researching with a scientist mentor. Independent work towards understanding the science research topic is expected. Oral presentations and research paper composition are large components of the course. Two reliable predictors for success are Science (90 or higher) and English (90 or higher). As with introduction to science research, this course requires a significant amount of time outside of the school day and over the summer. [BACK TO TOP](#)

Advanced Science Research:

The third year of Science Research is the program's capstone experience. In this course, students make use of all acquired skills and knowledge of their topic of choice by pulling together their summer work into a final authentic research project in the form of a technical paper, poster, and digital presentation. Students will again participate in local, regional, and international science competitions and symposia including the prestigious Regeneron Science Talent Search (formerly the Westinghouse and then the Intel Science Talent Search) and the Siemens Competition. Conducting research at a graduate level and beyond, students have been invited to become published authors in peer reviewed journal articles, present at international conferences, and even earn paid summer internships before their freshman year of college. Students are eligible for 4 college credits from SUNY Albany for their senior year. You are the future of science!

½ Year: Full Year: Full Year w/ Lab: Regents Exam: Honors: Potential College credit: Summer Assignment:
Prerequisites: Intro & Intermediate Science Research, completion of summer assignment Target Audience: 12 grade students.

Suggested Guidelines: Students that typically do well in this course are: self-motivated, perseverant, organized, able to manage a significant amount of independent work, have strong reading, writing, and communication skills, and are able to devote their summers to researching with a scientist mentor. Independent work towards understanding the science research topic is expected. Oral presentations and research paper composition are large components of the course. Two reliable predictors for success are Science (90 or higher) and English (90 or higher). As with other science research courses, this course requires a significant amount of time outside of the school day and over the summer. [BACK TO TOP](#)

Science and Technology Department

Mission Statement

The mission of the Science and Technology department at BCSD is to provide students with STEM experiences that leverage their innate curiosity and fascination with the world while building deep content knowledge and 21st century skills. We are committed to providing a diverse suite of course offerings that are intentionally designed to allow each student to find success according to their individual interests, strengths, and learning styles. Students need to understand science and technology not only to open doors to potential careers but to navigate the world in which we live.

As teachers, we are in the business of preparing students to think critically, develop a firm grasp on technology and work towards understanding systems. We believe that science, engineering and computer science, above all else, must be fun, engaging, relevant, interactive, and infused with skills that will translate into future success. All our programs integrate current technology to retrieve, process, and communicate information and as a tool to enhance learning. Finally, it is the goal of the department that students will apply the knowledge and skills of science and technology to address real-life problems and make informed decisions.

Science and Technology perhaps more than any other discipline is evolving. As the world changes, so too does the focus of our department. The vision that follows is part of our commitment to honor our mission for the students of BCSD in the face of that change. Many of these ideas are in their infancy and will require continued conversation and input from all stakeholders. We look forward to this exciting work as we aim to refine and grow in order to provide the most current, skills-based, career-oriented, and aligned science and technology education possible. Please feel free to reach out with input and ideas, together we can elevate the STEM experience for the children of Bedford Central School District.