

# Course Offerings

## 2024-2025

### 9<sup>th</sup> GRADE

#### Core Courses

[Biology Regents](#)  
[Bilingual Biology Regents](#)  
[ESOL 2](#)

#### Electives (Taken in Combination with a Core Course)

[Introduction to Engineering and Design](#) \*\*

### 10<sup>th</sup> GRADE

#### Core Courses

[Biology Regents](#)  
[Bilingual Biology Regents](#)  
[Chemistry Regents](#)  
[Chemistry Honors](#)  
[Integrated Science](#)

#### Electives (Taken in Combination with a Core Course)

[Introduction to Engineering and Design](#) \*\*      [Animal Behavior](#) (½ year)  
[Principles of Engineering](#) \*\*      [SUNY The Science of Natural Disasters](#) \*\*  
[Introduction to Science Research](#) \*\*      [Computer Science](#)  
[Ethics of Science](#) (½ year)      [AP Computer Science Principles](#) \*\*  
[Bilingual Public Health](#)      [Outdoor Exploration](#) (½ year)  
[Epidemiology and Public Health](#) (½ yr)

### 11<sup>th</sup> GRADE

#### Core Courses

[Integrated Science](#)  
[Chemistry Regents](#)  
[Chemistry Honors](#)  
[Applied Physics](#)  
[Physics Regents](#)  
[Physics with AP Science](#)

#### Electives (Taken in Combination with a Core Course)

[Introduction to Engineering and Design](#) \*\*      [SUNY The Science of Natural Disasters](#) \*\*  
[Principles of Engineering](#) \*\*      [Science of Food](#) (½ year)  
[Computer Integrated Manufacturing](#) \*\*      [Ethics of Science](#) (½ year)  
[Introduction to Science Research](#) \*\*      [Bilingual Public Health](#)  
[Intermediate Science Research](#) \*\*      [Animal Behavior](#) (½ year)  
[SUPA Forensic Science](#) \*\*      [Epidemiology and Public Health](#) (½ yr)  
[AP Chemistry](#) \*\*      [Outdoor Exploration](#) (½ year)  
[AP Physics](#) \*\*      [Computer Science](#)  
[AP Biology](#) \*\*      [AP Computer Science Principles](#) \*\*  
[AP Environmental Science](#) \*\*      [AP Computer Science A](#) \*\*

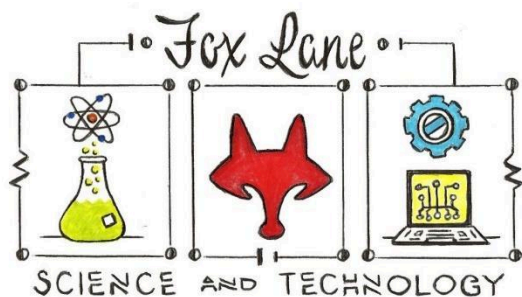
### 12<sup>th</sup> GRADE

Any of the following courses are available to senior students that have successfully completed three core courses.

<a href="#">Integrated Science</a>	<a href="#">SUNY The Science of Natural Disasters</a> **	<a href="#">Ethics of Science</a> (½ year)
<a href="#">Chemistry Regents</a>	<a href="#">SUPA Forensic Science</a> **	<a href="#">Bilingual Public Health</a>
<a href="#">AP Chemistry</a> **	<a href="#">Capstone STEM</a>	<a href="#">Animal Behavior</a> (½ year)
<a href="#">Applied Physics</a>	<a href="#">Introduction to Engineering and Design</a> **	<a href="#">Epidemiology and Public Health</a> (½ yr)
<a href="#">Physics Regents</a>	<a href="#">Principles of Engineering</a> **	<a href="#">Outdoor Exploration</a> (½ year)
<a href="#">Physics with AP Science</a>	<a href="#">Computer Integrated Manufacturing</a> **	<a href="#">Computer Science</a>
<a href="#">AP Physics</a> **	<a href="#">Engineering Design and Development</a> **	<a href="#">AP Computer Science Principles</a> **
<a href="#">AP Biology</a> **	<a href="#">Advanced Science Research</a> **	<a href="#">AP Computer Science A</a> **
<a href="#">AP Environmental Science</a> **		<a href="#">Science of Food</a> (½ 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

## Biology Regents:

Living Environment at Fox Lane High School is a full year course open to 9<sup>th</sup>-12<sup>th</sup> 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 is a requirement for a NYS high school Regents diploma and 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 (20-30 minutes per night) while completing the mandatory NYS requirement of 20 laboratory experiences and corresponding lab reports/write-ups.

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## Bilingual Biology Regents:

Students in the Bilingual Biology Regents course will learn in a bilingual Spanish-English setting about how organisms function and interact with each other and their environment. Topics studies will include the nature of life, microscopy, the scientific method, biochemistry, cytology, genetics, evolution, human physiology, ecology and human impact on the environment. Admission to the Final Regents Examination is contingent upon satisfactory completion of a required minimum of 20 Lab 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:   
Prerequisite: Teacher recommendation, interview by instructor, parental permission, and advanced language proficiency in Spanish.

## ESOL 2 Science

ESOL Science is designed to provide an introduction to foundational concepts and ideas related to biology. English Language learners will expand their knowledge of English grammar, expand their academic vocabulary and practice reading and writing strategies while exploring science topics, such as the scientific method, microscopy, biochemistry, cytology, ecology and human impact on the environment through an inquiry-based, hands-on approach. Students will have the opportunity to engage in field work, laboratory experiments, and research projects.

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

## AP Biology:

AP Biology is an introductory, college-level course in biology that spans two semesters worth of biology content.. 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. 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 a final exam followed by the AP Exam in May and a dissection 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.      [BACK TO TOP](#)

Suggested Guidelines: The workload includes reading with in-depth analysis questions, labs and outlines. Students are expected to complete a 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, rates and unit conversions. Students who typically perform well, without undue stress, are *conscientious* students with a keen interest in biology who are internally motivated, who can *write coherently and thoroughly* and who can *manage their time well*. Reliable predictors of success are: Chemistry Regents Exam (90 or above), Geometry and Algebra II (85 or above). [BACK TO TOP](#)

## **Epidemiology and Public Health:**

Are you considering a career in the medical field, science research or even data analysis? What is an epidemiologist? What makes one disease more likely to spread compared to another? Why are conditions like heart disease more prevalent in certain areas of the world? From the CDC: "When disease outbreaks or other threats emerge, epidemiologists are on the scene to investigate. Often called "Disease Detectives", epidemiologists search for the cause of disease, identify people who are at risk, determine how to control or stop the spread or prevent it from happening again." In addition to the aforementioned roles, epidemiologists also play a role in educating the public on current health concerns. They work closely with historians, journalists, field researchers, doctors, and others. In this course, we will use case studies of historical disease and health issues to explore today's issues in public health. We'll investigate hypothetical scenarios and come up with methods of action to best solve problems considering both public concerns and data analysis. If you're ready to be on the case for the next emerging disease, this course is for you.

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, Algebra I Target Audience: 10-12 grade students.

Suggested Guidelines: EPHS examines different subjects in health care relating to disease, statistical analysis and public outreach. Throughout the course, students will engage in class discussions and projects. Students will keep a live course journal via Google docs where they will individually reflect, ask, and answer questions. Assignments will include reading scientific articles, analyzing case studies, and completing textbook assignments. Additional responses will include responses to podcasts and TED talks as well as both individual and group research projects and presentations. Students who perform well are those who have a solid work ethic and a genuine interest in learning about public and global health concerns. Reliable predictors of success are: Living Environment Regents (85 or above), Chemistry Regents (85 or above), Geometry and/or Algebra II (85 or above). [BACK TO TOP](#)

## **Bilingual Public Health**

Students in the Bilingual Public Health course will learn in two languages (English and Spanish) to develop a better understanding of epidemiology, disease prevention, treatment and transmission, preventive medicine guidelines, healthcare careers, practices that promote healthy habits at home and at work, health economics and equitable access to healthcare.

Prerequisite: Teacher recommendation, interview by instructor, parental permission, and advanced language proficiency in Spanish.

## **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 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](#)

## Ethics of Science:

Many of the current moral issues have their foundation in technology therefore it is necessary that we focus our attention on science ethics. This is an interdisciplinary subject that intersects the core sciences, ethics and society. This course will investigate the history of science ethics 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 science ethical dilemmas.

½ Year:  Full Year:  Full Year w/ Lab:  Regents Exam:  Honors:  Potential College credit:  Summer Assignment:   
Prerequisites: Successful completion of Living Environment Target Audience: 10-12 grade students. [BACK TO TOP](#)

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.

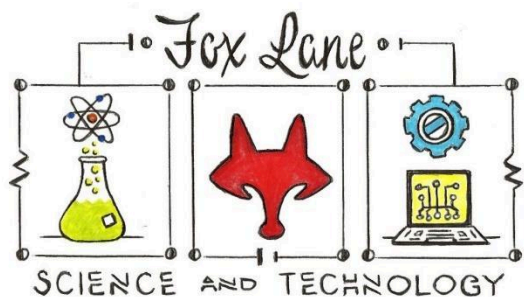
The workload in this course is not as substantial as for some other science courses, and the topics discussed are not necessarily as complicated when it comes to the scientific principles. It is, however, extremely complicated with regard to the thought process. The course requires students to have an 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](#)

## The Science of Food

Do you like to eat? Well then this class is for you! Food and nutrition impact everyone. We all spend at least some part of the day thinking about it. Where does it come from? How do I make it? Is it safe? Is it healthy? What are the societal impacts if I buy this banana? This Youtuber said I should eat algae, really??... Food safety and security are top priorities in our global economy. Understanding the evolution of food, food culture and how it is woven into the fabric of civilization will give you an understanding of the integrated nature of the systems that sustain our very existence. In this class we will explore these aspects of food and of course learn some amazing sustainable cooking techniques. This class is a fully integrated science that will call on your fundamental understandings of Chemistry, Physics, Biology and Earth Science. Bring your appetite and your problem solving skills!

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

Suggested Guidelines: This course is appropriate for any student with genuine interest in food and/or are considering a career in the food industry. [BACK TO TOP](#)



# Geosciences

## Outdoor Exploration:

Do you have a passion for the outdoors? Does hiking, orienteering, and learning how properly to use natural resources appeal to you? This half year course will provide a valuable opportunity to use our vast campus and explore an option outside of the traditional four walls of a classroom. This semester-long course will be divided by weekly themed topics such as hiking, basic first aid, survival skills, building bat or bird boxes, and many more including one off campus enrichment experience. This course will allow you to foster and embrace a passion for the outdoors while incorporating scientific curiosity. The greatest requirement for an outdoor education student is the desire to be outdoors and learn. Once the seed is planted, a lifetime of excitement awaits.

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: The course will be available to 10th-12th graders that have successfully completed the Living Environment or Earth Science course. This course will have a large outdoor component and students will be required to go outdoors minimally once or twice a week regardless of weather conditions. Students should be physically active and fit for outdoor activities.

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## SUNY The Science of Natural Disasters:

The Science of Natural Disasters provides an overview of natural disasters, such as earthquakes, volcanic eruptions, floods, tsunamis, mass movement, meteorite impact and severe weather (including hurricanes and longer term climate change). Students will learn about the geological and meteorological processes responsible for producing these disasters through the use of various national and international data sources, as well as local and national case studies. Lab experiences will provide opportunities for the application of the scientific method. In addition, this course will demonstrate how science can influence personal, societal, and governmental decisions.

Prerequisites: Earth Science Regents and Living Environment Regents

Target Audience: 10-12 students

Suggested Guidelines: Students that perform well in this class have a true passion for the environment, climate change and its global impact. They are also 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 successful completion of Earth Science Regents (75 or higher) and Living Environment Regents (75 or higher).

## AP Environmental Science:

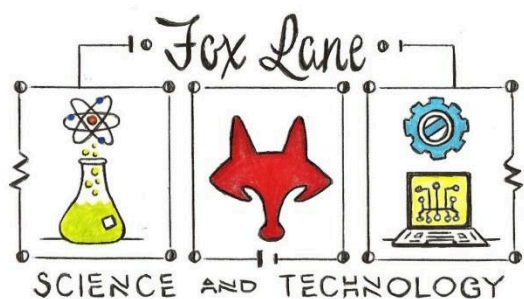
Environmental concerns plague our growing population, but knowledge is the key to living healthy, productive and sustainable lives. If you want to understand the complex science behind the environmental challenges facing our world and investigate new and evolving solutions, AP Environmental Science may 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 investigations and trips 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

## 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 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: 10<sup>th</sup> 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 be 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 (9<sup>th</sup> 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](#)

### SUPA 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, bloodstain 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, bloodstain 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. [BACK TO TOP](#)

Suggested Guidelines: This is a college level course. Students who typically do well in this course have been successful in multiple Regents science courses and Regents exams (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. 11<sup>th</sup> graders must be concurrently enrolled in another core science course and should use Forensics to satisfy a graduation requirement. [BACK TO TOP](#)

### Integrated Science

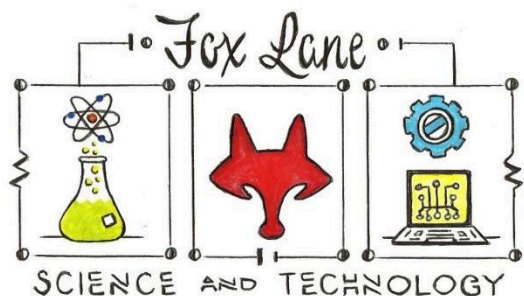
Chemistry and Physics are the foundations of science. Understanding these will allow you to relate to the world around you in a more meaningful way. This class will focus on the foundations of both Physics and Chemistry. For Chemistry this includes: understanding atoms, molecules, the periodic table and how and why chemical reactions occur. For Physics this includes: forces, mass, Newton's laws, gravity, light and electricity. We

will explore these through hands-on labs that will connect both sciences in a fun and meaningful way. Once you finish this class you will be ready to take on a higher level Chemistry or Physics course if you desire or head on into some electives with a strong foundation.

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: Integrated Science is for students that would benefit from an active learning environment focussed on building essential math/science skills. Successful completion of Unified Science prepares students to re-enter Regents Science courses (Chemistry or Physics) the following year. 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.

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# 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).

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## 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: 11<sup>th</sup> 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.

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## 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.

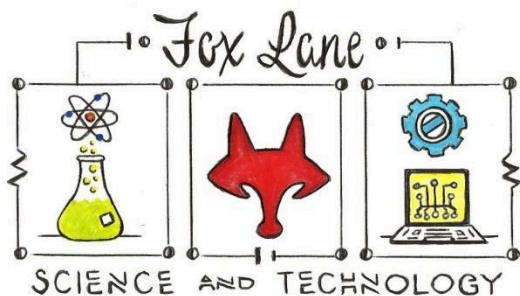
Suggested Guidelines: Applied Physics is a class open to students of all ability levels that are interested in Physics and building. The course focuses on hands-on construction and how they relate to the practical/conceptual themes of physics. There is a lesser focus on mathematical calculations and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

### Capstone STEM:

This course will focus on the Scientific Method along with developing soft skills that are important in many science sector careers. After an in depth introduction to the scientific and research methods, students will have opportunities to create and run experiments of their own design while being supported and guided by the teacher of the class. There will be benchmarks and meetings throughout the year to support the development of public speaking, presentation, data analysis, organization and goal setting skills. Each marking period will include a Student Showcase culminating in a student-designed and driven Science Fair in May. The course may be considered a fully inclusive stand alone single-year science research experience for those that did not participate in SR beginning in 10th grade. The course may also include certificates in [OSHA training](#) as well as [Excel](#) and other data tools that would give students credentials when applying for future jobs in the science sector.

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: Capstone STEM is open to students of all ability levels that are interested in a multidisciplinary science research experience. Students work toward a year-long active research project of their choosing and present their work as a final project. [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 Fusion360, 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: 9<sup>th</sup> grade students.

Suggested Guidelines: While mostly comprised of 9<sup>th</sup> 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 8<sup>th</sup> 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 8<sup>th</sup> 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.

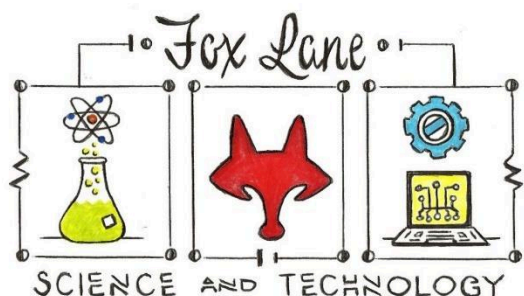
Suggested Guidelines: This class is offered to students who have already completed POE and are ready for the next level of Engineering. One quarter of the year is devoted to building and programming robots made from the VEX robotics equipment introduced in the POE class. Students who are successful in 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 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. [BACK TO TOP](#)



# 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, simple game design and animation, along with 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. [BACK TO TOP](#)

## 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 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: 10-12 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. [BACK TO TOP](#)

## 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 (10th Grade Students Need Instructor Approval).

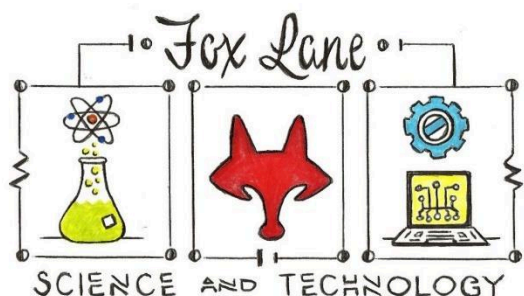
Suggested Guidelines: This course requires students to complete a wide range of tasks. While there is some coding, students also need to complete more traditional assignments. Students must be responsible and are expected to keep up with a wide range of assignments outside of class. Students that typically 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. Students entering the 10th grade must meet with the instructor for approval prior to enrolling in the class. [BACK TO TOP](#)

### AP Computer Science A:

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:

Through independent learning conducted during the summer before entering this program, students gain a foundation of knowledge about science, math and engineering topics of interest. Upon entering the school year, students engage in a review of scholarly literature to achieve a deep understanding of a specific area within their chosen field of focus. Students will search for and connect with a professional scientist mentor in order to develop a research project for the following summer and their next year of science research. Bi-weekly meetings between student and instructor will be used to monitor progress and provide support for the student. Goals for the student include but are not limited to: development of independent study skills; authentic scientific research; direct communication with the scientific community; demonstration of perseverance, resourcefulness, communication skills, and enthusiasm; presentation of research ideas to peers; preparation for participation in future local and national science competitions; and participation for the Somers 1st Year Research Student Competition. Participation in the end-of-the-year FLHS Science Research Symposium is required. 2 college credits through the University of Albany are offered to students who complete this course, conduct research over the summer, and continue on to the second year (see Intermediate Science Research). Summer research is expected of students planning to continue in the program.

FINAL EXAM: Students must attend and present at the year-end local symposium.

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, open to feedback and able to manage a significant amount of independent work. They also need to have strong reading, writing, and communication skills and are able to devote part of their summers to researching with a scientist mentor. 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 the 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:

The 2<sup>nd</sup> year of the research program immerses students in their research throughout the school year. Projects may involve trips to the lab/field, where students, under guidance from the scientist mentor and instructor, conduct an original project that they developed during their first year of science research. Data is collected over the previous summer and analyzed during the beginning of the school year. 2<sup>nd</sup> year students qualifying for various local, regional, state, national and/or international science competitions are encouraged to participate. Inherent within the framework of the science research program is the efficient and accurate communication of technically demanding information. Students continue reading journal articles on their specific research topic while honing their technical and professional communication skills. Students will learn about public speaking, presenting to peer-groups and professional scientists, organizing and producing a technical poster and professional slide presentation, and organizing and writing a formal research paper. Participation in the end-of-the-year FLHS Science Research Symposium is required. College credit through the University of Albany is available for both school year (4 credits) and summer research (2 credits). Bi-weekly meetings between the student and instructor will be used to monitor progress and provide support for the student. Summer research is required for students continuing on to the 3<sup>rd</sup> year in the program.

FINAL EXAM: Students must attend and present at the year-end local symposium.

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: See guidelines for participation in Introduction to Science Research.\*

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### Advanced Science Research:

The 3<sup>rd</sup> year of the research program focuses on the further development of key scientific communication skills. Students are encouraged to present his/her original research in various local, regional, state, national, and international science symposia and competitions, including the-Regeneron (formerly Intel) Science Talent Search. Students will continue to learn about public speaking, presenting to peer-groups and professional scientists, organizing and producing a technical poster and professional slide presentation, and organizing and writing a formal research paper. Participation in the end-of-the-year FLHS Science Research Symposium is required. Bi-weekly meetings between the student and instructor will be used to monitor progress and provide support for the student. 4 college credits through the University of Albany are offered for the school year.

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: See guidelines for participation in Introduction to Science Research.\*

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## 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 21<sup>st</sup> 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.