BERGEN COUNTY ACADEMIES

2017-2018

Information At A Glance

It All Happens Here!

BERGEN COUNTY TECHNICAL HIGH SCHOOL DISTRICT
Dr. John Grieco Campus • 200 Hackensack Avenue, Hackensack, New Jersey 07601
201-343-6000 • www.bergen.org
The Bergen County Technical School District does not discriminate on the basis of race, age, creed, religion, ancestry, national origin, socioeconomic status, affectational or sexual orientation, gender, disability, or marital status.
The Bergen County Academies offers students a unique high school experience that combines comprehensive academics with technical and professional courses. We encourage our students to choose an academy concentration based upon their interests rather than a future career choice.

Pursue your passion for science, art, computers, music, theatre, cooking, design, or finance—our programs will allow you to explore your interest while preparing you to meet the academic challenge of college. You may complement your studies with electives and clubs that cross academy boundaries; you are not limited to study in just one field. Students receive a fine academic background that prepares them well for postsecondary study in any field they choose.

THE ACADEMIES:

**AAST**
Academy for the Advancement of Science and Technology

**ABF**
Academy for Business and Finance

**ACHA**
Academy for Culinary Arts and Hospitality Administration

**AEDT**
Academy for Engineering Design Technology

**AMST**
Academy for Medical Science Technology

**ATCS**
Academy for Technology and Computer Science

**AVPA**
Academy for Visual and Performing Arts

For information on our curriculum and laboratory facilities, please visit our website: [http://bcts.bergen.org](http://bcts.bergen.org).
Program Descriptions

The Bergen County Academies includes seven specialized high school programs; each emphasis is a different career path. Our graduates attend a wide range of universities and colleges throughout the nation and abroad.

There are many opportunities for a student in one academy to interact with students from another. Students participate in interdisciplinary and class-wide projects as they take math, humanities, and world language courses together. Students can take part in independent study, numerous academic and skills competitions, cultural travel, and college residency experiences. Sports programs and after school activities supplement Academies life. Finally, to connect with the world of work, each student participates in an internship for academic credit during his or her senior year.

For complete program descriptions, please visit our web site: http://bcts.bergen.org

AAST
Academy for the Advancement of Science and Technology

Students applying to the Academy for Science and Technology should have a passion for science and a curiosity to explore modern scientific questions through a comprehensive, hands-on curriculum. The AAST core curriculum incorporates classes taken with other BCA students while emphasizing its own academy focus. For example, AAST students take multiple years of biology, chemistry and physics together with AEDT students while completing studies in chemical engineering, microscopy, organic chemistry and modern physics particular to AAST. Graduates from AAST are prepared to continue studies across a wide range of scientific disciplines or to pursue areas such as medicine, law and public policy which will continue to be informed by the sciences as the 21st century progresses.

The following are a few of the highlights included in the AAST curriculum:
• During the freshmen year, AAST students learn the theories and techniques necessary to complete real-world investigations in nanotechnology, biotechnology, chemistry, microscopy and optics.
• AAST sophomores explore the practical and environmental considerations involved in scaling experiments from the small classroom laboratory to the large industrial production plant.
• Junior and Senior students extend their theoretical knowledge and laboratory skills to the study of organic chemistry and can choose among several AP or IB science electives. Throughout the curriculum, students are encouraged to find original answers to modern research challenges using the state-of-the-art facilities available on campus.

Many of the AAST faculty have years of industrial experience and several hold doctorates in their area of expertise. Additionally, through our Senior Experience program and other industrial or academic collaborations, AAST students have several opportunities to interact with outside experts from institutions including Columbia, BASF, Princeton, Stevens and the American Museum of Natural History to name just a few. Whether they pursue further science or choose another path, AAST graduates possess the knowledge, skills and experience to succeed in a number of fields.
This Academy provides an introduction to the world of business in addition to a comprehensive academic program. Students typically have a strong aptitude for mathematics, possess advanced writing skills, and are interested in business, finance, marketing, and economics. Business principles are taught in multiple, high-level core courses which incorporate topics such as: the global business environment, management, marketing, finance, economics and entrepreneurship. ABF students often become involved in a variety of national and international business and economic competitions such as the High School Federal Reserve Bank Challenge and the Fairleigh Dickinson University Business Idea program. They also participate in nationally-recognized business organizations such as DECA (an association of marketing students).

ABF has incorporated an emphasis on a global perspective. The driving force behind this global component is the integration of the International Baccalaureate curriculum to an already rigorous course of study. The IB Diploma Program, in which all ABF 11th and 12th graders enroll, is an internationally recognized degree program administered by the International Baccalaureate Organization in Geneva, Switzerland. To earn the IB diploma, students must complete a two year sequence of courses in humanities, math, and science. In addition, ABF students are required to complete a senior thesis and a unique class on interdisciplinary analysis, as well as requirements in the arts, community service, and athletics.

A unique feature of our Academy is the Financial Markets Lab. Our lab is equipped with Bloomberg technology, a resource utilized by finance professionals worldwide; it enables our students to conduct economic and financial research and analysis using real-time economic and market data and sophisticated analytic tools. Our proximity to New York City offers our students opportunities to visit some of the world's leading financial institutions. Furthermore, our global exchange program offers students the opportunity to gain exposure to the international business community.
AEDT

Academy for Engineering and Design Technology (AEDT) was developed as an extension of AAST with specific concentration in the engineering sciences, including design technology, computer science, manufacturing, electronics, and biomedical engineering. Students in this academy have a concentration in engineering and design courses and focus on skills which are generally useful in any engineering curriculum.

Students are drawn to the Engineering Academy because they like to create, build, or reverse-engineer things. They have the opportunity to do this in state-of-the-art classrooms and laboratories. Projects include product development, civil or architectural designs, robotic competitions, and much more. Students must have a strong desire to solve problems using math, science, and technology. They should like to work with their hands, and apply their creativity to engineering. Organizational skills, such as maintaining computer files, keeping project journals and building portfolios are needed. Communication skills are a plus.

AEDT focuses on general engineering disciplines and prepares students for entrance into college engineering programs. While not everyone in this academy will pursue engineering, those that choose to do so have a solid background in the field and are likely to successfully master college courses. Students are also prepared to pursue careers in the technical aspects of business or law. Articulation agreements with universities enable AEDT students to receive college credit for some of the core courses taken in this program.

ACAHA

Academy for Culinary Arts and Hospitality Administration

ACAHA students have a strong interest and passion for culinary arts as well as hospitality administration. This academy is ideal for those who would like to pursue a career in either field, or who are interested in the subject material and seek a well rounded high school experience that offers an honors-level core curriculum augmented by elective options in all facets of hospitality, management, customer service, entrepreneurship, and advanced culinary / pastry arts.

Students train in a sophisticated culinary facility that rivals many professional restaurant sites. The curriculum includes foundations of hospitality and restaurant management. Electives in AP Micro and Macro Economics are emphasized. The course of study leads to certification from the National Restaurant Association Education Foundation, which can lead to hospitality scholarship opportunities. Articulation agreements with universities enable students to receive some college credit. For students interested in a career in hospitality management or the culinary arts, ACAHA offers the best possible preparation for college hospitality programs such as Cornell University's School of Hotel Administration.

While at the Academies, ACAHA seniors have interned at Restaurant Daniel, the Loews Regency Hotel and the New York Hilton.
The Academy for Medical Science Technology's program of study is a system-based approach to medicine that allows students to learn the basic sciences in an integrated format. Students take rigorous academic requirements in mathematics, humanities, foreign language and the arts. Transdisciplinary class-wide projects, from ninth through eleventh grade, develop teamwork, communication and presentation skills promoting an integrated, multidimensional approach to learning. All students complete core areas, complemented by required units in humanities, creative cultural arts, physical education, health, projects, and also choose electives each trimester. All academic courses are taught at the honors level or above.

ATCS students develop a strong foundational understanding of programming, computer architecture, data structures and algorithms, and program analysis. Throughout their careers at BCA, students extend their skills in computing through projects and electives of their choice, often including processor design, web application development, robotics, computer security, and mechatronics.

Because of their strong backgrounds in computer science, ATCS students have competed successfully in prominent competitions such as The International Computer Science Olympiad, Panasonic Challenge, National Center for Women & Information Technology, the Future Business Leaders of America Competition, and the American Computer Science League.

The program is oriented around underlying ideas that will never become obsolete, even as technologies change. ATCS students will be well prepared for a college major such as computer science, computer engineering, or information systems. Those who decide not to pursue computer-related careers in the future will find that the technical skills they have acquired through the academy’s curriculum will prove to be useful in a number of other fields.
AVPA

ACADEMY FOR VISUAL AND PERFORMING ARTS
AVPA offers three areas of concentration: Music, Theatre Arts, and Visual Arts.

Music

Students in the Academy for Visual and Performing Arts - Music (AVPA-M) have an outstanding ability in music and are the strongest musicians in their communities. Students in this program study an academic, honors-level college preparatory curriculum with a focus in music.

Ninth graders begin the program by enhancing their keyboard/piano skills in Digital Key-boarding. They also take Musicianship. In this exciting methods course, students learn woodwind, brass, string and percussion instruments. Conducting is also an important part of the course, as is rhythm dictation and score reading/interpretation. The course ends with a special project in the music technology field.

In tenth grade, students take a rigorous AP course in music theory and may earn college credit: AP (Advanced Placement) Music Theory in the Digital Age. The course includes harmonic analysis, counterpoint, voice leading, and ear training. An exhibition of students’ digital compositions is also part of the curriculum.

In eleventh grade, the curriculum extends beyond AP Music Theory, and students participate in Advanced Problems in Music Theory & Technology. Here, students delve into augmented sixth and Neapolitan chords, fugal composition techniques, and analysis of twentieth-century music.

The AVPA-Music curriculum ensures a rounded arts education with Music & Society. Also taken in eleventh grade, the course teaches the evolution of compositional style with corresponding art and socio-political trends.

In twelfth grade, students apply their compositional techniques with their technological skills in Electronic Music Synthesis. Students work with state-of-the-art software such as Finale and Pro Tools. The course culminates with each student completing a formal composition. Seniors complete the AVPA-Music program with Senior Music and Media Seminar, where they present a lecture-recital or build a musical instrument.
**Theatre Arts**
The AVPA theatre arts concentration is a rigorous training program for students interested in pursuing a college major in theatre or film leading to a career in some aspect of the entertainment industry. Core courses include sequences in acting, dance, voice and speech, musical theatre, theatre history, theatrical design, dramatic writing, and directing. In addition to studying with faculty members (all of whom have professional training and experience) AVPA theatre students work with outside industry professionals in every aspect of classwork and production. Students are required to participate, as performers and technicians, in at least one out of three major theatrical productions each year.

Our goal is to nurture creativity and imagination, develop skills and discipline, and emphasize process. Rather than provide students with a single technique we introduce young artists to a variety of methods (Viewpoints, Stanislavsky technique, monologue, and classical work), encouraging them to learn to work in ways most productive for their individual growth. Theatre concentration students will be well prepared to audition for college and conservatory Theatre Arts programs and will be ready for almost any college major or career path encountered in the 21st Century. AVPA theatre alumni work in the entertainment field, on Broadway and in TV, film, and other media, as well as other fields such as medicine, science, law, business and politics.

Students acquire a deep understanding of multiple perspectives and world views, and a keen ear for the subtleties and nuances in language, music and movement. Moreover, they have enhanced and developed imaginative capacity, flexible ways of thinking, self-discipline, sophisticated presentation techniques, and superior collaboration skills.

**Visual Arts**
The AVPA visual arts concentration contains a mix of traditional and digital design and production, with a strong emphasis on digital. The program is designed for students interested in pursuing a college major in any one of a broad range of arts including graphic and web design, illustration, photography, film/animation/video, game design, package design, traditional/fine arts, art history, and so much more.

All of the courses help students develop creativity and critical thinking skills, tools to help them succeed in any major or career, including related fields like architecture, engineering, and computer science.

Core courses cover a broad range of topics, including the Adobe Creative Suite, the principles and elements of design, drawing, web development, video production, laser cutting and engraving, just to name a few. Along with core courses, students are able to explore their interests further through electives and research-style classes. They are given the opportunity to develop their imagination and boost their creativity through hands-on, experiential learning. The courses range from 3-D environments with Maya, virtual reality with Oculus and Vive, and Arduino, to painting, sculpture, printmaking, and stage set construction, and many other options.

During their time in the academy, students participate in exhibitions and competitions. The skills learned here have helped them take top honors in prestigious events such as the Governor’s School, C-SPAN Film Documentaries, and Scholastic Arts. Through the development of an interactive, virtual reality environment, the school has also developed a strong relationship with the National Parks commission and is continually working on projects with them. Students also attend field trips and take part in the design and construction of environments for events like the AVPA Halloween Haunted House. In this event, every grade level gets involved and lets their imagination run wild, while developing skills in every area of the arts.
A typical school day starts at 8:00 a.m. with IGS (Informational Gathering Session). This is similar to homeroom. One big difference between the Academies and other schools is the length of the school day. School ends at 4:10 p.m., but if you choose to participate in a sport, the day may end even later.

BCA classes are divided into modules, commonly called “mods,” that are approximately 17 minutes long. Classes are typically between 2-3 mods. Each day’s schedule is different: Monday schedules are similar to Thursdays and Tuesdays are similar to Fridays. Wednesdays are unique. All students take a 6-mod class called Projects except seniors who have internships.

Each student has a certain amount of “free” mods. This is when they have no scheduled classes. They may choose to do their homework during their free mods or utilize the time to meet up with project partners or study with friends.

The last hour of the day is dedicated to electives, or on Wednesdays, clubs. Students may participate in a sport instead of taking an elective. Students may also stay in school late to work on a project with a group or use materials only available in the school. There is a late bus at 6:30 p.m.

### A SAMPLING OF ACADEMY ELECTIVES

For a complete listing of current electives, please visit our web site: http://bcts.bergen.org

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<th>Introduction to 3D Printing</th>
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<td>Beginning Modern Dance</td>
<td>Forensic Science</td>
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<td>Musical Theatre Songwriting</td>
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<td>Music &amp; Society Musical Theatre Production (the BCA Musical)</td>
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<td>Comparative Asian Cultures</td>
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Clubs and Activities

Extracurricular activities at BCA are just as numerous, diverse, and exciting as our courses. Visit our website to see a complete listing of the clubs and activities offered to our students.

A sampling of extracurriculars includes...

**BCA Pre-Law** This club introduces students to the various areas of law (prosecutors, criminal defense, corporate, public interest, patent law, entertainment law, IP intellectual property law), discusses preparation for law school (admissions, internships, LSATs, accelerated BA/JD programs). In addition to guest speakers from the profession, there is a scheduled trip to State Superior Court for criminal sentencing and to the Bergen County Jail/Forensics Unit.

**Chess Team** The BCA Chess Team usually wins the NJ Scholastic Championship and placed among the top ten in national team championships. Team members practice by competing in tournaments, including five rated competitions hosted by the Academies.

**Debate Team** Each year, teams throughout the country are assigned a topic to research and debate. Debate is prepared in groups of two, with each “team” having to argue both sides of the debate. The team's performance is evaluated by a panel of judges. Competitions occur once a month at local schools. Anyone who is willing to commit to the work can be a Freshman or JV debater; our Varsity team is limited to twelve students.

**Electronic Journalism** Reading “The Academy Chronicle” is a good way to delve into the mind of a teen. Writing for it is a good way to learn about journalism. Topics covered include hard news, technology, entertainment, sports, and opinion. To learn more, visit www.academychronicle.com.

**Federal Reserve Challenge** The Challenge is an academic competition designed to help students gain a deeper understanding of how the Federal Government develops monetary policy. Federal Government does not develop monetary policy. Monetary policy is developed and implemented by the Federal Reserve, our Central Bank. A five-member team conducts an analysis of the current state of the economy and puts forth a monetary policy recommendation for the Federal Open Market Committee. Judges question each team about their presentation and their knowledge of macroeconomic theory. Federal Reserve Bank economists judge the competitions.

**Quiz Bowl** This club gives you the chance to play mock rounds of high school quiz bowl, where you compete as a team, answering questions about every topic there is and get the opportunity to attend real tournaments as a part of BCA’s nationally recognized team. The BCA Quizbowl Team attended the 5th annual National History Bee and Bowl competition in Arlington, Virginia. BCA students competed against players from across the United States in team and individual events at this challenging, fast-paced competition and achieved their best results yet. The Junior Varsity team won the Bergen County JV champions last year.
GLOBAL EDUCATION AT BCA
2016-2017

The Bergen County Academies Global Education Initiative seeks to prepare students for success in a global economy and workforce; to provide students with an opportunity to interact with their peers in a global environment; to engender increased respect for values and traditions other than one’s own; and to give students real-world exposure to, and experience with, students from another part of the world.

London/Hong Kong: Students from the Academy for Business and Finance/International Baccalaureate Program are offered an international educational experience with study abroad opportunities in London, England and Honk Kong, China. London and Hong Kong were chosen as the alternate-year destinations based on their global prominence in business and economics as well as the contrast in cultures between east and west, all while still being in an English-speaking country. The study abroad experience is designed around four themes—Business and Economics, Community Service, Global Education, and Cultural Experiences. The goal is to afford every ABF student a chance to study abroad twice during their BCA career, alternating between two distinctive cultural settings.

Japan: The Japanese Ministry of Education and Kokutaiji High School invite BCA students and teachers to International Science Symposiums that take place for one week during the school year. BCA students reside in Hiroshima and attend classes at Kokutaiji High School, participate in curriculum project sessions, give a presentation at the Symposium, visit the Peace Memorial Park and other scenic sights in Hiroshima while enjoying Japanese food and culture. BCA recently signed a Memorandum of Understanding that the two schools will continue their collaborative efforts centered on joint scientific curriculum projects.

Israel: Sixteen students and three faculty members traveled to Israel and participated in a fact-finding and collaboration-building mission to Israel. The trip was based on the common educational language of STEM — science, technology, engineering, and mathematics. The group visited hotbeds of innovation including the Weizmann Institute of Science, Technion-Israel Institute of Technology (often referred to as Israel’s MIT), and Google’s Tel Aviv campus, as well as high-tech company Applied Materials, an Air Force base, World ORT’s YOU-niversity afterschool innovation learning center, and high schools excelling in STEM. (They also saw more standard tourist sites — Jerusalem’s Old City, Rosh Hanikra, Ein Gedi, Masada, Tel Aviv-Jaffa, and a Druze village.

The students and teachers returned eager to establish a relationship with the award-winning Shechakim High School for Excellence and Leadership in Nahariya, a city in northern Israel. Greece: The Bergen County Academies, AVPA continued their sister school collaboration with Pierce College/American College of Greece (a high school in Athens Greece) when 14 Pierce students and 3 teachers visited BCA for a week long study abroad experience this April. The partnership included joint educational projects between our students and cultural engagements in New Jersey and New York City. The highlight of the visit was the BCA families providing homestays for the Greek students which allowed for a broader global experience with the BCA community. The educational culmination of the trip was a production by the Greek students where they performed Woman’s Voices, a combination of Antigone by Sophocles and Electra and Medea by Euripides that highlighted the three tragic heroines who each undergo their own misfortune that characterized the female gender.

Costa Rica: Thirteen students and two teachers attended a language and cultural immersion tour of Costa Rica. The tour included nature hikes observing the biodiversity of Costa Rica, learning about the production of local cheeses and the hydroponic farming of strawberries, eating at the home of a local family as the students learned to make their own tortilla, visiting Colegio Técnico Jacó, a technical high school and participating in classes – all of this while having to communicate in Spanish.

Student testimonial –

Had you asked me 4 months ago whether I thought I would be able to go to Israel with school I would have laughed. Little did I know that you would present me with the amazing, life-changing opportunity to experience Israel as a global ambassador representing Bergen County Academies. And I truly thank you for making this far-fetched illusion a fantastic reality that enlightened the lives of numerous people, myself included. Nowhere else presents students with the opportunity to learn about technology and culture of other nations through first-hand experiences. Thank you again!

Yours Truly,
JL, AAST 2019
**RESEARCH 2016-2017**

The unique Research program at BCA, open to students from all academies, gives our aspiring students the opportunity to develop a research project based on their personal interests. Students at other high schools may have the opportunity to do research internships at cooperating professional labs, only students at our school have access to the latest scientific equipment to pursue their research interests internally, adjusted to their individual schedules.

**Stem Cell Research:** This laboratory is extremely well equipped. There is an array of state of the art instrumentation available to students who complete the prerequisite course “Research Applications is Molecular Biology and Genetics”. Students are encouraged to develop research projects based on their own interests, to develop the habit of picking important scientific questions to answer.

Our research education program has recently been improved by the access to and collaboration with the surgical lab at Englewood Hospital and Medical Center (EHMC), a prestigious teaching hospital affiliated with the Mount Sinai Medical College in NYC. Selected research students who participate in the surgical training course learn live animal surgical techniques, and many have begun to use animals in their research, expanding the range of scientific questions that can be addressed. Our access to this and other prestigious medical centers in the NY-NJ area, encompassing doctors and scientists with a large and varied repertoire of cutting edge medical and educational techniques allows us to offer something of value to our colleagues and collaborators around the world.

In the past year alone, students from the Stem Cell Research lab have won awards from the major science competitions, including Regeneron, Siemens, Microsoft’s Imagine World Cup, NJ academy of Science, Young Science Achievers Program, HOSA, iSweep, Exploravision and Tech Crunch, among others.

**Cell Biology:** The students working in our Laboratory of Cell Biology were awarded numerous accolades during the 16-17 academic year through advancing past competitions at the state level. The laboratory had two Regeneron Science Talent Search Finalists who spent a week competing in Washington, DC alongside 40 others from across the nation. One brought home first place and the top prize of $250,000 (more than any other high school competition) and the other winning $25,000 for her research. One of these students was also named a Siemens Regional Finalist, and five students were declared Siemens Semi-finalists and Regeneron Semi-finalists as a result of their cell biology research. Three students travelled to the National Junior Science and Humanities Symposium in San Diego, where one student took second place and won over $10,000 after also being invited to India earlier in the year to present her research as a result of her efforts. Two students travelled to Houston to compete as iSWEEEP International Finalists, and they took first and third place. Several students also took top honors at the New Jersey Academy of Science Symposium and the Young Science Achievers competition held during the school year. This past spring, four students were awarded the opportunity to represent North Jersey Academy of Science, YOung Science Achievers Program, HOSA, iSweep, Exploravision and Tech Crunch, among others.

**Math:** This program is aimed at preparing students for contests based on math research such as Siemens and Regeneron Science Talent Search. The students write papers in Combinatorics, Number Theory, Geometry among other areas of math. Every year our students win math grants through YSAP. They also take part in NJRSEISEF, AMC 10, AMC 12, AIME, USA Math Olympiad and the International Math Olympiad. This year our students won 17 YSAP grants in the field of applied mathematics. Recently a student won the USA Math Olympiad and a gold medal at the International Math Olympiad in Thailand. Another student won third place and a $40,000 scholarship at the Siemens competition in Math, Science and Technology.

**Physics/Optics:** This program provides opportunities for students to work on various projects and gain experimental and analytical skills to excel in Physics. Students can work on advanced Optics projects including Interferometry, Holography and Fiber Optics. There exists an opportunity to be involved in building a spectroscopy setup as well, which aims at measuring minuscule amounts of trace gases (CO2) using optogalvanic laser spectroscopy. The nature of the project can involve setting up experiments, data acquisition, data analysis, and software programming. There are also opportunities to work on theoretical physics - in particular Quantum Computing in collaboration with Stevens Institute of Technology. Students working on original research ideas are encouraged to submit their work to AAPT Conference or Journal of Undergraduate Physics as well as other competitions. Some of the previous lab members did research in collaboration with nearby universities such as Princeton, NJIT and Stevens Institute of Technology.
The mission of BCA Research is to expose students to scientific inquiry, research and instrumentation, and to provide transferable, first-hand experiences with the techniques, practices and perspectives of professional scientists. By expanding the capabilities and context of secondary science education, we believe that students will be better equipped for, and more likely to pursue leadership positions in science, scientific research and global-scale problem solving.

The foundations of the research program at BCA are deeply rooted in providing a real-world research environment for students to develop the independence, accountability, vision and drive to become outstanding members and future leaders within the science community. Our research program is based on six foundational principles, which work in concert with one another, to lay the groundwork necessary to nurture and challenge students to strive for excellence.

**Perspective**

Perspective can be thought of as the jumping off point between traditional classroom teaching and independent research.

**Purpose**

Students conducting independent research come to understand the purpose of their research. When developing the project and determining necessary experiments, students must understand the purpose of performing each experiment.

**Resources**

The tools needed to carry out experimentation make up a portion of the students’ resources in a research project. Understanding how to use an instrument and obtain data, as well as determining the best tool to use for an experiment are important skills that a student develops in the experimentation stage of a project.

*Students using the scanning electron microscope to investigate nanomaterials, which can be used as a drug delivery system with a wide variety of applications. The SEM allows students to visualize objects that are too small to be seen with either the naked eye, or even a light microscope, with magnifying power up to 100,000 times. It is also possible to use the SEM to determine the chemical composition of a sample.*

*The purpose of this project is to study a relationship between the exosomal transfer of alpha-synuclein, a prominent protein in Lewy Body Dementia and some types of Parkinson’s disease and the potentially infectious nature of the protein. In the picture, the student is taking of his cells which have been transfected to overproduce alpha-synuclein.*
One of the students is investigating the role of the alpha synuclein protein on cell death and on the uptake of the neurotransmitter dopamine in order to more fully understand diseases like Parkinson’s. She is currently isolating RNA from cells that have been modified to stop making alpha synuclein to see if a lack of the protein influences the production of other proteins.

The other student is treating lung cancer cells with increasing concentrations of EGCG (a compound from green tea) to test the impact on a family of proteins (heat shock proteins). These proteins help cancer cells to survive, and he is testing whether EGCG can lower the levels of these proteins.

Proper analysis includes dissection and interpretation of the data, plotting data into easy to understand visual charts, determination of statistical significance, and differentiating nuances between correlation and causation.

Student analyzes the results from her Real Time PCR (RT-PCR) experiment. She is studying the effect of a chemical from green tea, called EGCG, on the regulation of a micro-RNA gene (miRNA34a) that is known to be involved in the suppression of tumor growth. This technique can precisely measure the level of the RNA in treated cells.

Collaboration with other students is a necessary part of the independent research project. Students involved in research will collaborate in a peer to peer format, where students discuss topics, review others work, and provide feedback.

It is necessary for a student to share the findings in the same way that a professional would. Students must compile the findings of the study in the form of a written report, poster, oral presentation, or in some cases, a publication.

Metallic nanoparticles are synthesized via simple reduction reactions to produce various colors of aqueous suspensions. Students are presenting their characterization of different colors of nanoparticles using UV-Vis spectrophotometer.
During their first three years at the Academies, students will spend two hours every Wednesday working on an interdisciplinary project. Students will have the opportunity to choose a different project each trimester. Some aspects of the projects are fairly consistent:

- Using the Internet to research a topic;
- Working in more than one discipline;
- Working as part of a team; and,
- Making a final presentation.

Students can choose among the available teacher-designed projects. Previous projects have included:

- Alternative Energy
- Aerospace Engineering
- Experimental Psychology
- Journalism Workshop
- Applied Web App Development
- Biotechnology Lab
- Agriscience
- Mission Mars
- Design for the Theatre
- Entrepreneurship
- History of the Cocoa Bean
- Combinatorics and Geometry
- Mechatronics
- Kitchen Chemistry
- Project Choir
- Nanostructural Imaging
- Pit Orchestra
- Musical Theater Workshop
- Art and Politics
- Physics Olympiad
- Yearbook
- Contemporary Chinese Society
- Augmented Reality and Ellis Island
- Creative Dance
- Ad Agency

The Academies focuses on developing students' readiness for the workplace. To help students prepare for their professional futures, the Academies requires that each student in the 12th grade complete an internship program called “Senior Experience.”

**Overview**

Senior Experience is a program in which students spend each Wednesday working in an internship at a company, office, laboratory, or other workplace. Each student identifies an area of interest and is placed accordingly to gain practical experience in their chosen field. A full-time faculty member coordinates and oversees the internships.

The essential component of a successful internship is the student’s active participation in an area of interest under the guidance of a mentor. Different mentors approach this in different ways. Some mentors design a special project specifically designed for the student to develop his/her skills. Others bring the student into an ongoing project. The internship may be in any discipline or involve any profession; however, it is mandatory that the student be an active participant in activities related to the field of study.

To learn more about Senior Experience, and see a partial list of worksite placements, visit our web site: http://bcts.bergen.org.
Department recognizes that the college selection process becomes a major focus. Understanding its importance, counselors work with students to ensure a smooth, confident approach for this sometimes daunting task. Junior College Night is held every year in the winter of junior year for parents and students to understand the entirety of the college process. Immediately after this important night, counselors conduct college planning conferences with students and his/her family to demystify the college process, suggest appropriate collegiate prospects, and guide students through testing and application procedures. Each year, the School Counseling Department hosts numerous college visits, professional speakers, financial aid nights, and our annual spring college fair which attracts over 150 prestigious college and universities.

As junior year comes to an end, students are invited to attend our annual College Exploration Experience (CEE), a three day, two-night program that serves as an intensive look at the college admission process. Students will attend seminars on topics such as How Colleges Select Students, How to Write Your College Essay, and The College Interview. They will be given a mentor who will meet with them in a small group or individual setting to answer questions, refine their essay, and help create a custom list of colleges to consider. Our mentors are both college admissions officers and experienced independent school counselors. They represent selective colleges and universities as well as some of the most prestigious independent schools in the country. While this program is not required, it is highly recommended by our School Counseling Department and previous attendees.

Fall of senior year is an especially busy time in the school counseling office. Counselors assist students with applications, essay critiques and college lists. Although applying to college can be a stressful time in a student and family’s life, counselors provide ongoing support and resources to navigate through these challenging times.

Throughout high school, our students utilize Naviance, an online career and college portal. This excellent tool allows students, parents and counselors to communicate about the college process, research what majors are offered at different colleges and maintain a working list of college prospects. With Naviance, the college process becomes far less daunting and students are able to truly assess which colleges are best for their personal goals and abilities. Parents are able to access Naviance as well, so that they can be fully involved and active in the college process.

Although a student’s needs vary at each grade level, our commitment to each student’s success remains the same. From encouraging students to reach out when they need a helping hand or supporting them through tough times, the School Counseling Department is committed to helping each student reach and surpass their academic, social, and emotional potential.
Students at the Academies play on sports teams with students from Bergen County Technical Schools’ Teterboro and Paramus campuses. Bergen Tech Athletics compete in the Big North conference and the NJTAC. Our teams compete at the varsity, junior varsity, and freshman levels.

The athletic program is an integral part of the total educational process at Bergen County Technical High School District. Young people learn a great deal through their participation in interscholastic athletics. Determination, perseverance, sportsmanship, communication, and teamwork are some of the valuable attributes that can be attained through athletic participation. Athletics plays an important role in helping the individual student develop a positive self-concept as well as a healthy body. Athletic competition fosters school spirit and develops pride in the school and community for participants, students and spectators. Student-Athletes will leave our athletic programs with the readiness to be active participants in today’s global community.

Through athletics we seek to provide a wholesome form of physical activity for as many students as possible. We will make every effort to offer our student-athletes the best in equipment, facilities, and coaching, in order to provide them with an enjoyable and rewarding athletic experience. While the reputation of our school and community is enhanced whenever its representatives excel, by far the greatest rewards and satisfactions are derived by the number of students who actually participate on our athletic teams.

We believe that the soul of our school can be reflected in what occurs before and after the normal academic day. This extension of the school day, whether it be in athletics, in the arts, or in clubs will set the tone for the school year. If we can keep students involved and concerned beyond the classroom, we are bound to have a more positive effect on them in the classroom. We are aware of the tremendous obligations we have as coaches and administrators to the student-athletes in our care. Parents entrust their children to us and we shall always strive to strengthen that bond.

**SPORTS OFFERED**

**FALL**
- Football—Varsity, Sub-Varsity
- Boys/Girls Soccer—Varsity, Junior Varsity, and Freshman
- Boys/Girls Cross Country—Varsity
- Girls Tennis—Varsity and Junior Varsity
- Girls Volleyball—Varsity, Junior Varsity, and Freshman
- Cheerleading

**WINTER**
- Boys/Girls Basketball—Varsity, Junior Varsity, and Freshman
- Boys/Girls Bowling
- Boys/Girls Fencing
- Boys/Girls Indoor Track
- Cheerleading

**SPRING**
- Baseball—Varsity, Junior Varsity, and Freshman
- Softball—Varsity, Junior Varsity, and Freshman
- Boys/Girls Golf
- Boys Lacrosse—Varsity and Junior Varsity
- Girls Lacrosse—Varsity and Junior Varsity
- Boys Tennis—Varsity and Junior Varsity
- Boys/Girls Track—Varsity
- Boys Volleyball—Varsity and Junior Varsity

**ACCOLODES 2016-2017**

<table>
<thead>
<tr>
<th>Season</th>
<th>Sports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>Girls Tennis - N.J.S.I.A.A. State Sectional Champions, Boys Soccer – N.J.T.A.C. Champions</td>
</tr>
<tr>
<td>Spring</td>
<td>Girls Golf – Big North Liberty Division Champions, Boys Tennis – Big North Liberty Division Champions, Boys Golf – Big North Liberty Division Champions, Boys Volleyball – Big North Liberty Division Co-Champions</td>
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</tbody>
</table>
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