

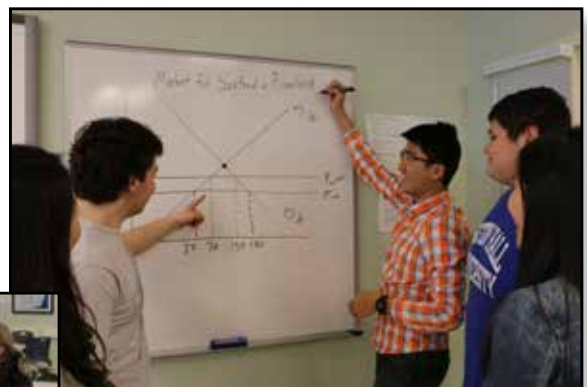
BERGEN COUNTY ACADEMIES



2015-2016 GUIDE TO THE ACADEMIES

**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.

AN ACADEMIES EDUCATION

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
(International Baccalaureate)

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>.*



Dr. John Grieco

Bergen County Academies is committed to following the visionary leadership of Dr. John Grieco, who was Superintendent from the inception of the Academy for the Advancement of Science and Technology in 1992.

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.



ABF/IB

ACADEMY FOR BUSINESS AND FINANCE (INTERNATIONAL BACCALAUREATE)

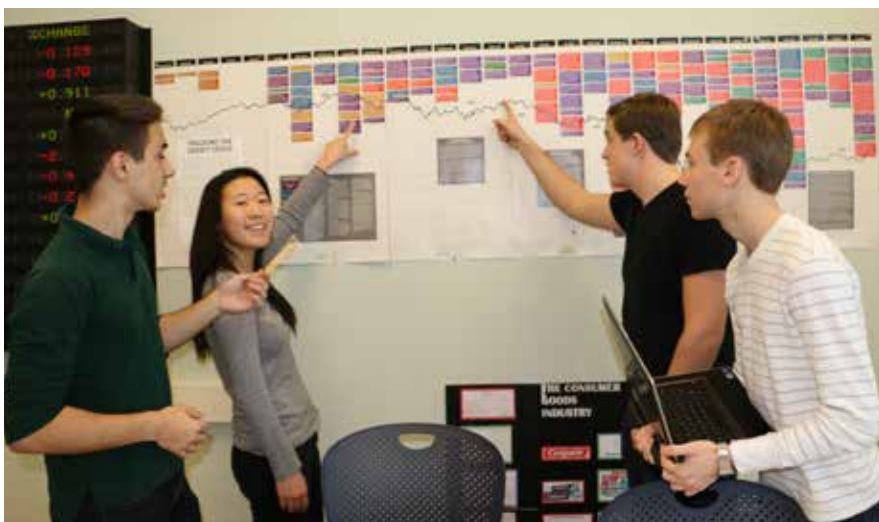


This Academy provides an introduction to the world of business in addition to a comprehensive academic program. Students typically have a strong aptitude for mathematics, possess advanced writing skills, and are interested in business, finance, marketing, and economics. Business principles are taught 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.



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.

AEDT

ACADEMY FOR ENGINEERING AND DESIGN TECHNOLOGY



The 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.



AMST **ACADEMY FOR MEDICAL SCIENCE TECHNOLOGY**

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 promotion 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.



The Research programs at the Bergen County Academies operate within highly sophisticated, state-of-the-art laboratories that have been designed and equipped to allow exploration within a variety of scientific disciplines. The labs are functional, professional entities, not normally found in a high school setting. They include cell and molecular biology, nanotechnology, microscopy and a variety of engineering programs. Many of our students have won significant national and international awards, and some have been able to publish their findings in professional journals.



ATCS **ACADEMY FOR TECHNOLOGY AND COMPUTER SCIENCE**



This program is ideal for students who have a strong interest in technology and computer science. The Academy for Technology and Computer Science offers a curriculum that focuses on computer architecture, computer programming, computer technologies, and networking. Partnerships with leading corporations such as Dell,

Oracle, Microsoft, Google, Hewlett-Packard, and IBM give our students access to curricular resources that other schools cannot approach. ATCS prepares students for industry certifications, including Microsoft and Java. Students may also qualify for advanced placement in college by enrolling in the AP Computer Science course as well as other courses such as data structures.

Because of their strong backgrounds in computer science, ATCS students have competed successfully in the following programming competitions: The IBM Mainframe Contest, The International Computer Science Olympiad, the New Jersey Institute of Technology Programming Competition, the Oracle Programming Competition, the Future Business Leaders of America Competition, and the American Computer Science League. An ATCS student will be well prepared for a college major such as computer science, computer engineering, or information systems.

ATCS students 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 Keyboarding. 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.

Tenth graders learn current technological and compositional techniques 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. The AVPA-M program ensures a rounded arts education with Music & Society: a course that teaches the evolution of the style with the corresponding art and socio-political trends.

In eleventh grade, students take a rigorous AP course in music theory and may earn college credit: AP (Advanced Placement) Music Theory in the Digital Age. They study music theory at the college-level, including harmonic analysis, counterpoint, voice leading and ear training. An exhibition of students' digital compositions is also part of the curriculum.

In twelfth grade, students go beyond the AP theory curriculum 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. Twelfth graders complete the program with Senior Music and Media Seminar, where they present a lecture-recital or build a musical instrument!

Finally, each AVPA-M student is required to participate in 2 trimesters of a performing music course each year (band, orchestra, choir or ensemble). The AVPA-M program is not a conservatory or a full-time performing arts program- we offer a college preparatory, academic honors program, with a focus in music.



AVPA

ACADEMY FOR VISUAL AND PERFORMING ARTS

AVPA offers three areas of concentration: Music, Theatre Arts, and Visual Arts.

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 those fields. Core courses include sequences in acting, voice and speech, theatre history, dramatic writing and directing. In addition to studying with faculty members (all of whom have professional training and experience) AVPA theatre students work with industry professionals in the study of dance, musical theatre, and the business of theatre. Students are required to participate, either as performers or technicians, in two 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 (i.e. mask work, viewpoints, Stanislavsky technique), encouraging them to learn to work in ways most productive for their individual growth.



Visual Arts The visual arts concentration is a college preparatory program specializing in the latest advances in the arts, including 2D and 3D animation, print/digital publishing, and multi-media. Students study every

essential aspect of the visual arts field through immersion in a curriculum that embraces these new technologies, while still emphasizing traditional skills and principles of art and design. While blending art and technology, students have the freedom to explore their strongest interests. Some of the latest areas of research include development with Maya 3D modeling software, Unity game development software, Oculus Rift virtual reality headsets, and Arduino programming to create immersive, virtual reality experiences in conjunction with Ellis Island and the National Parks Service.

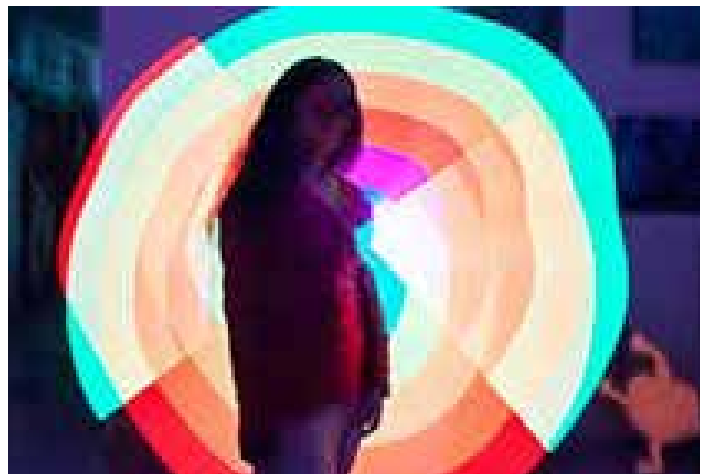
The curriculum is driven by computer graphics instruction and imaging technologies. Core classes specifically designed for Visual Students include an introduction to visual arts and graphic communication, design and production techniques, publishing, and digital imaging. Students are required to build and maintain a portfolio that exhibits a high degree of creativity as well as technical proficiency. Works in the portfolio range from traditional drawing and painting to

Theatre concentration students will be well prepared to audition for college and conservatory Theatre Arts programs (BA and BFA). AVPA theatre students, because of their course of study, will be ready for almost any college major or career path encountered in the 21st Century.



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, and sophisticated presentation skills.

photography, print and web design, computer animation and gaming, and video. Students have access to internships in literally hundreds of production houses that support the art and imaging needs of prestigious metro area businesses. They also have the opportunity to achieve certification with Adobe software, including InDesign, PhotoShop, Illustrator, Flash, Dreamweaver, and Premiere.



The admissions process includes a portfolio review. We want to see where students' interests lie and get a feel about how passionate they are about their art. All types of art are acceptable, both traditional and non-traditional, from paintings, drawings, and sculpture, to computer graphics, animation, web development, photography, video, etc.

A DAY IN THE LIFE OF AN ACADEMY STUDENT

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.

MODS	Monday	Tuesday	Wednesday
	IGS	IGS	IGS
1-3	Intro Business Topics	Spanish II	Free Spanish II
4-6	Free	Free	Projects
7-9	Study Skills	Financial Literacy	
10-12	Lunch	Lunch	Lunch
13-15	Early America	Management Information Systems	Early America
16-18	Biology	Biology	Free
19-21	American Literature I	Gym/Health	American Literature I
22-24	Analysis I	Analysis I	Free
25-27	Electives or Free	Electives or Free	Clubs

A SAMPLING OF ACADEMY ELECTIVES

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

Optics & Lasers	Developmental Biology	Introduction to 3D Printing	Paper Art
All About Chocolate	Digital Imaging	Introduction to Microscopy	Pre AP Studio Art
Acting Methods	Digital Photography	Life Drawing	Pre Engineering Comp
Arduino	Earthquakes	Markets & Trading	Processors 2: Assembly
Art of Advertising	Euro Challenge	Math Problem Solving Seminar	Res Mol Bio Gen
Astronomy	Fashion and Sewing	Math Team	Research in Cell Biology
Baking for Holidays	Federal Reserve Challenge	Medical Microbiology	SAT Math Workshop
Beginning Ballroom Dance	Financial Accounting	Medical Bots Engineering	Screen Process
Beginning Modern Dance	Forensic Science	Memory Train Systems	Screenwriting
Bio Engineering	Foundations of Computing	Mod Optical Physics	Shakespeare - Film
Bioethics	Foundations of Nano	Model UN	Songwriters Circle
Biological Psych	Interactive Design	Modern Russian History I	Sports Medicine
Chinese Calligraphy	Introduction Anat & Physio	Modern Russian History II	Stage Management
Choir	Introduction Surgical Technique	Musical Theatre Songwriting	Stagecraft
Civil Engineering	Introduction to Java Programming	Music & Society Musical Theatre Production (the BCA Musical)	Stories of Anton Chekhov
Comparative Asian Cultures	Introduction to Mandarin I	Nanoscale Materials Science	Stories of Youth
Concert Choir	Introduction to Mandarin II	Number Theory	Studio Art
Costume Design	Introduction to Python	Organic Chemistry I	Topics Oncology & Hematology
Creative Arts Workshop	Introduction to Robotics	Organic Chemistry II	Virology
Creative Writing	Introduction to Video Prod		World Cuisines
			Zoology



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

Global Education Initiative provides our students the opportunities to collaborate with their peers from around the world. Our students learn respect for values and traditions from other countries as they prepare for a potential future in a global economy and workforce.

BCA Global Programs in the 2014-2015 School Year

November 2014: Sister School collaboration with Kohutaiji High School (KHS), Hiroshima, Japan - Now, for the third time, BCA students took to the stage in Japan to share joint research—this time on their efforts to capture and harvest an asteroid. With a display of technological dexterity and skill, the students performed a live demonstration of their work to present their findings to more than 2,000 students from Hiroshima prefecture. In addition to the presentation of research, representatives from the Japanese Prefectural Board, the Ministry of Education, and almost 1,000 students gathered in the KHS gymnasium to witness the signing of the agreement to extend the ongoing partnership.

February 2015: 2014-2015 International Art-Design STEM Program by Ulsan National Institute of Science and Technology (UNIST), Ulsan, South Korea - Ulsan Science High School (USHS) and Bergen County Academies continued their ongoing relationship by attending this one week program focused on scientific research techniques. The program included UNIST professors' research presentations and their the state-of-the-art laboratory tours, industry visits (Hyundai Motors, Hyundai Heavy Industry Shipyards), with culminations of student presentations from both BCA and USHS. It is the hope of both schools that this program will be a catalyst for future joint research projects and summer study abroad events.

November 2014: ABFIB International Experience: London - For the first time, in November 2014, students from the Academy for Business and Finance/International Baccalaureate Program were offered an international educational experience. London was chosen as the inaugural destination for its global prominence in business and economics as well as a nonexistent language barrier. The trip was designed from the ground up around four themes—Corporate Visits, CAS (IB Community Service), Global Education, and Cultural Experiences. Through these experiences the 34 ABF students and 3 chaperones bonded together and returned to the US with not only a new appreciation for the world, but a new appreciation for the IB Diploma and for each other.



RESEARCH

Students at the Academies learn science by conducting hands-on research in our state-of-the-art facilities. The goal of our research program is to enable students to learn how to think and work similar to scientists. Research students learn to stretch beyond the numbers and terminology of science. They learn how to devise scientific questions, to acquire and analyze data, and to properly communicate their ideas. Sustainability and environmental soundness are considerations in designing projects. Currently, our research program includes the five following options:

Chemistry/Nanotechnology Students in this program are provided the tools and technical expertise to synthesize, manipulate, analyze and visualize interesting nanoscale structures for various applications. Research projects may incorporate the use of UV-Vis-NIR spectrophotometry, Fourier transform infrared spectrophotometry, Atomic absorption spectroscopy, Dynamic light scattering particle size analyzer, and/or Contact angle measurement tool equipped with a high speed camera in the areas of nanomaterial fabrication. Last year, the lab added equipment to facilitate high-level organic synthesis research (a benchtop Nuclear magnetic resonance spectroscopy) and air-sensitive lithium ion battery research (Glove box). This year, a senior student developed methodology to turn mechanical movements into electricity using nanofiber generators; the work was presented at the National Junior Science and Humanities Symposium and recognized by Intel and Siemens.

Molecular Biology and Genetics Students pursuing this research program option learn how the programming of living cells can be altered through the manipulation of genetic information. Through their research, students learn how to clone, modify, and transfer genes to cultured cells and organisms, as well as what goes into the propagation and differentiation of stem cells.

Several students this year made major advances in their research projects. One student developed a sensitive assay to identify and quantitate deletions in mitochondrial DNA, and subsequently demonstrated that these deletions correlate with certain cellular events in stem cells, notably aging. He won second prize at the Intel Science and Engineering Fair (ISEF) and became a Google semifinalist with this work. A recent graduate studied the role of the human sirtuin 1 gene (SIRT1), a survival gene that protects cells from stress, in the accumulation of amyloid β ($A\beta$) and tau proteins in a neuroblastoma cell line. Another student studied the role of the human sirtuin 1 gene (SIRT1), a survival gene that protects cells from stress, in the accumulation of amyloid β ($A\beta$) and tau proteins in a neuroblastoma cell line. Such work could contribute to our understanding of the development of neurofibrillary tangles in Alzheimer's disease. Aishwarya won first prize at the ISEF competition and was

also named a Finalist in the Biogenius competition in Boston.

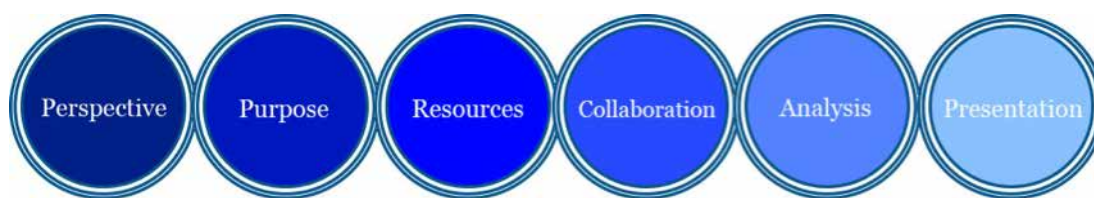
Cell Biology Research Research in this laboratory utilizes cellular and molecular biology techniques in the elucidation and manipulation of signal transduction pathways to address pertinent topics in medicine and health, food security, and water quality. Young innovators are using CRISPR/cas9 gene editing to address cancer cell proliferation, exosome delivery of miRNA for therapy, plant immune system elicitors to decrease the use of pesticides, and peptides to decrease potential biofilm formation in water delivery systems in developing countries. This lab has produced an invitee to the White House Science Fair, 5 INTEL Science Talent Search Finalists, a first place finalist at the Junior Science and Humanities Symposium, as well as over 50 finalists and semifinalists in INTEL STS, Siemens, Google Science Fair, ISEF, BioGENEius, Junior Science and Humanities Symposium, and the American Academy of Sciences. Students have published in peer reviewed journals and have collaborated with scientists in academia. Research students in this lab also facilitate the annual Bergen SciChallenge, a Broadcom Masters affiliated middle school science fair.

Experimental Psychology Students in this research program use proven methods to study psychological disorders and processes. The program guides students in the development of laboratory techniques necessary to explore the mind and behavior, as well as the study of perception, memory, thinking, and learning.

Math Research Program The Math research program is aimed at preparing students for contests based on math research such as Siemens and Intel talent search. The students write papers in Combinatorics, Number Theory, Geometry etc. Every year our students win math grants through YSAP. They also take part in NJRSF, ISEF, AMC 10, AMC 12, AIME, USA Math Olympiad and the International Math Olympiad. This year 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.

THE ACADEMY RESEARCH MISSION

<http://research.bergen.org/>



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 can be thought of as the jumping off point between traditional classroom teaching and independent research. Students gain perspective in three ways. First, they must be taught the basic principles, theories, and historical perspectives that have shaped and formed our current understanding of modern science.

The second perspective is personal. Students are asked what in science or society truly interests them, connects with them, or affects them. If given unlimited resources, what question would they want to study, and what problem would they want to solve. This internal perspective can be intimidating, but it allows students to begin to think like a scientist, and creates an immediate investment in the research. Since the student developed the idea, they feel a greater sense of accountability when it comes to its success or failure.

Students third gain perspective on the current state of science and research. Students must understand what research is currently being conducted by performing primary literature searches on their topic. This is an important, but difficult stage for the students. Understanding where to go to locate journal articles and how to dissect out the pertinent information is a skill that

takes practice and patience, but will be valuable for the student beyond high school. Through the reading multiple papers on a topic, and with the guidance of the instructor, a student gains the perspective needed to develop the structure for their project, and insight into how and where research is done.



Students conducting independent research come to understand the purpose of their research on two scales. The first deals with the goals of the project. When developing the project and determining necessary experiments, students must understand the purpose of performing each experiment, the possible outcomes, and the goals that are to be achieved at each stage. Understanding the purpose of each experiment forces the abstract information gathered from the primary literature to be focused into a logical progression of tests throughout the project.

Next, the larger scale purpose of the research must also be considered by the student. This greater purpose normally coincides with the student's reasons for wanting to do the project (the internal perspective previously mentioned). The perspective gained through background literature research kindles students understanding of the current state of the field and the importance of where the project would fit into the field. Thus, the greater purpose is understood by the student and is a motivator to work diligently to obtain meaningful results that may contribute to the greater body of knowledge on the subject.



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.

The techniques that a student learns become an important resource. The experimentation stage of the project introduces students to techniques and skills, which through practice, precision, and dedication become mastery. These skills are transferable to any future lab environment a student encounters. The quality of results in a project hinges on the careful execution of techniques and protocols by the student.

The final resource that is critical to student success is guidance by the mentor or instructor. Without a mentor who is patient and engaged in all stages of the independent research project, the techniques cannot be properly taught and the tools are rendered useless. The mentor watches over the student after teaching the tools and techniques, but it is the student who is responsible for the success or failure of a given experiment. Although the mentor is critical in guiding the student through the research project, they are not the only guide students must have. Comfort reaching out to, learning to collaborate with other students, teachers, and professionals alike.



Collaborating with other mentors and professionals is important in order to develop additional techniques needed in the research project. Prior to discussing the research project with outside professionals, the student must fully gain confidence and understand the core concepts and methods of the project, question the topics that are still met with difficulty, and intelligently discuss the future direction of the project based on results. As collaboration is a critical part of professional research, it is also a critical step in preparing students for a future in science.

Collaboration with other students is also 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. This peer to peer collaboration is important for the students because it allows for independent growth in the project without the direct oversight and guidance of the mentor. When a student reaches the later stages of research, the student will also collaborate with others in more of a mentor role, where students who are newer to research or struggling with a technique or protocol can receive guidance from the more advanced student.



Running an assay or experiment is important in order to obtain data and results. Learning to analyze the results can be a more difficult task. 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.

In addition to analyzing the data, students must also analyze the research project as a whole. By analyzing the overall project, students ensure that the core concepts of the project are understood, that necessary and logical experiments were carried out, and that the data is meaningful and easily understood. Once all of the analysis has been carried out, the student is ready for the culminating stage of the independent research project.



The experience of carrying out a research project and putting into practice the information that is learned in the classroom is critical in this model, in order to change the way science is taught in this country. However, after all of the lab work and analysis is completed, 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. This process allows students to practice important presentation and technical writing skills that will be needed in future education and careers. This also allows the students to showcase work that they were involved in for months or even years, and receiving feedback in order to make improvements.



PROJECTS

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:

- All About Art: The Louvre and Prado Museum Collections
- Alternative Energy
- Aerospace Engineering
- Building Bridges
- Business In The News
- China Road
- Experimental Psychology
- Journalism Workshop
- Mission Mars
- Design for the Theatre
- SimMan
- Entrepreneurship
- History of the Cocoa Bean/Chocolate Competition
- Combinatorics and Geometry
- Mechatronics
- Kitchen Chemistry
- Project Choir
- Nanostructural Imaging
- Pit Orchestra
- Physics Olympiad
- WBCA-TV
- Yearbook

SENIOR EXPERIENCE



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>.



SCHOOL AND COLLEGE COUNSELING



Bergen County Academies is fortunate to attract students with a multitude of talents and interests. The School Counseling Department provides a safe, supportive and nurturing environment for students to learn and grow in an academically challenging institution. Our mission is to provide academic, social, and emotional support at each

grade level in order for each student to reach and surpass their individual potential. Working in partnership with teachers, administrators, parents, and community members, we provide the necessary support that students require during their adolescent years.

Through a developmental school counseling program, our counselors work with students every step of the way throughout their high school career. The process begins first trimester of freshmen year with the seminar course "Freshmen Exploration for Social, Emotional and Academic Success." Knowing it can be difficult adjusting into the high school culture; this course enables students to become comfortable with their school counselor as well as peers while also exploring typical adolescent issues. By providing freshmen with the necessary academic, social and emotional skills for personal growth and development, students begin to understand their role in creating a positive school climate and making informed choices.

During sophomore year, students again work hand in hand with their school counselor in "Sophomore Seminar," a course which addresses important issues related to academic, career and college planning. At this time, counselors discuss AP/IB course selection, the value of enrolling in meaningful summer programs and activities, standardized testing options, and methods of finding colleges that will be a "good fit." This seminar is designed to reduce the stress and anxiety students often encounter as they move forward towards their postsecondary goals.

During sophomore and junior year, students have the opportunity to attend optional multi-day overnight college tours. Students visit college campuses where they attend information sessions with admissions staff and tour each school. By eating in college dining halls and attending evening activities, students acquire a first-hand feel for a school's environment. These tours allow students to sample a wide variety of colleges in the company of their peers while under the supervision of their school counselors.

As students enter junior year, the School Counseling 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 are utilized 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.

SPORTS

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



ACCOLADES 2014-2015

Fall: Cross-County - NJTAC Cross County Champions,
Girls Tennis- Big North Liberty Division Champions

Winter: Fencing - B.P.F.L. Boys & Girls Fencing League Champions, Competitive Cheerleading - NJTAC

Spring: Girls Golf – Big North Liberty Division Champions, Big North Tournament Champions, Second Place at the Bergen County Championships, North Jersey Open Winners,
Boys Tennis – Big North Liberty Division Champions, Boys Golf – Big North Liberty Division Champions,
Baseball- NJTAC Champions





BERGEN COUNTY TECHNICAL SCHOOLS BOARD OF EDUCATION

JASON KIM, *President*
WILLIAM J. MEISNER, Ed.D., *Vice President*
NORAH PECK, *Interim Executive County Superintendent*
MARIE E. LA TESTA
RAYMOND J. HRYCZYK

BERGEN COUNTY TECHNICAL SCHOOLS ADMINISTRATION

DR. HOWARD LERNER, *Superintendent*
JOHN SUSINO, *Business Administrator/Board Secretary*
ANDREA SHERIDAN, *Assistant Superintendent*
RICHARD PANICUCCI, *Assistant Superintendent for Curriculum and Instruction*

BERGEN COUNTY EXECUTIVE

JAMES J. TEDESCO III

BERGEN COUNTY BOARD OF CHOSEN FREEHOLDERS

JOAN M. VOSS, *Chairwoman*
STEVE TANELLI, *Vice Chairman*
JOHN A. FELICE, *Chair Pro Tempore*
MAURA DENICOLA
DAVID L. GANZ
THOMAS J. SULLIVAN JR.
TRACY SILNA ZUR

HACKENSACK CAMPUS ADMINISTRATION

RUSSELL DAVIS, *Principal*
RAYMOND BATH, ESQ., *Vice Principal*
GIULIA ZANONI-MENDELSON, *Supervisor*
VICTOR LYNCH, *Supervisor*

*A special thanks to the students and faculty of the Investigative Journalism and Yearbook projects
for their contributions to this booklet.*