

DOWNINGTOWN

STEM Academy



335 Manor Avenue

Downingtown, Pennsylvania 19335

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DOWNINGTOWN S.T.E.M. ACADEMY

SCIENCE • TECHNOLOGY • ENGINEERING • MATH

AN INTERNATIONAL BACCALAUREATE WORLD SCHOOL



SCHOOL PROFILE 2013 – 2014

“EFFORT CREATES INTELLIGENCE”

STEM Academy

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www.dasd-sharepoint.dasd.org/Schools/STEMAcademy

Administration

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Superintendent of Schools

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Director of K-12 Ed. Programs

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Headmaster

Mr. Zachary Ruff
Dean of Academics and Student Affairs

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*IB CAS/EE Coordinator
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CEEB Code: 391-036

DISTRICT MISSION

The mission of the Downingtown Area School District, proud of our tradition of excellence, is to educate all students to meet the challenges of a global society by providing an individually responsive learning environment characterized by outstanding academic and personal achievement in partnership with family, students, and community.

THE COMMUNITY AND DISTRICT HIGH SCHOOLS

Located in Chester County, Pennsylvania, Downingtown Area School District is a suburban residential community with a thriving business district. An abundance of new housing developments has caused a significant increase in school district enrollment. Currently, the District serves nearly 12,000 students and has three high schools: Downingtown High School-East Campus, Downingtown High School-West Campus, and the Downingtown STEM Academy. The East and West high school campuses offer traditional high school programs and curricula. The Academy features a project and inquiry-based learning environment which focuses on science, technology, engineering and mathematics (STEM).

THE STEM ACADEMY

With a current enrollment of 800 students, 200 in each of grades 9, 10, 11, and 12, the STEM Academy opened its doors in 2011. A district magnet school, the Academy is designed to attract academically diverse students with significant interest in the STEM fields. A one-to-one laptop initiative school, the Academy offers an academically challenging program of study that exposes students to a variety of science and technology courses and employs the International Baccalaureate (IB) curriculum. In addition to various learning opportunities in the classroom, the Academy also facilitates STEM related career exploration for all students through its community partnerships.

The Board of School Directors provides oversight of the Academy. An advisory board comprised of area business and industry professionals helps steer Academy initiatives and programs, including internships and other field experiences.

PRE-DIPLOMA/HONORS COURSES

World Literature
American Literature
International Studies
Civics and Government
Algebra I
Geometry
Algebra II
Math Analysis
Universal Physics
Biology
Chemistry
Spanish (IV)
French (IV)
German (IV)

INTERNATIONAL BACCALAUREATE COURSES

English Language A1 (SL/HL)
Modern Language B (SL/HL)
Modern Language ab initio (SL)
Psychology (SL)
History (SL/HL)
Mathematics (SL/HL)
Visual Arts (SL/HL)
Biology (SL/HL)
Chemistry (SL/HL)
Physics (SL/HL)
Economics (SL)
Business and Mgmt. (SL)
Music Group Performance (SL)
Music Solo Performance (SL)

CAREER PATHWAYS

Academy of Health, Medicine, and Biology

Academy of Applied Science and Engineering

Academy of Technology, Media, and Communications

Academy of Corporate and Mathematical Innovation

ADMISSIONS CRITERIA

Eighth grade students residing in the Downingtown Area School district are eligible for admission to the Academy provided they have completed Algebra I, earned a “C” average in all core classes in 6th, 7th, and 8th grades, and submitted the Academy’s application, which includes three essays and a teacher recommendation. All Academy applications are triple blind scored by a team of school district professionals. Each year, approximately 200 students are offered admission out of the 450 that apply.

ACADEMY CURRICULUM

The International Baccalaureate (IB) Diploma Programme is a rigorous liberal arts curriculum that prepares 11th and 12th grade students for university study. STEM Academy students largely participate in the full IB Diploma Program, which consists of six IB courses, the Theory of Knowledge course, the Extended Essay, and Creativity, Action, and Service (CAS). Those students who do not choose to participate in the full diploma program pursue IB certificates in each of the disciplines. To prepare students for the International Baccalaureate Programme, the STEM Academy offers “Pre-Diploma” classes for all 9th and 10th grade students.

Classes are offered in the context of a modified block schedule. STEM Academy students earn approximately 6-7 credits each year. Special opportunities for students include participation in the Academy’s intensive career pathways program, college/university dual enrollment opportunities, and field study experiences.

CAREER PATHWAYS PROGRAM

The STEM Academy provides opportunities for students during the junior and senior years to explore a specific career area of interest through course work, trips, speakers, research and university-based activities. The four career academies, offered by the Academy, largely reflect STEM fields and each academy culminates in an individualized capstone activity, or STEM Practicum. The following Academies are available to students: 1) Academy of Corporate and Mathematical Innovation; 2) Academy of Health, Medicine and Biology 3) Academy of Applied Science and Engineering; 4) Academy of Technology, Media and Communications.

The STEM Practicum is the culmination of students’ work and experiences in their STEM Pathways at the Academy, further developing their critical thinking and practical work skills. The practicum also provides them with the opportunity to make informed decisions regarding their future career choices. The practicum includes a Career Exploration, Independent Research Project or STEM related College Course. The Career Exploration is a 21 hour on-site experience with STEM Academy business partners.





Explore, Create, Innovate

The Downingtown STEM Academy provides opportunities for students during the junior and senior years to explore a focused content area of interest. Students are able to engage in course work, internships, research, and university level activities to inspire a future career pathway.



Academy

In partnership with businesses, corporations, parents, and students, the Academy identified four critical areas of academia that will promote student growth through inquiry and project-based learning. The four “Academies” are an opportunity for students to explore, create, and innovate in a 21st Century emersion program. Each Academy culminates in the senior year with an individualized capstone or STEM Practicum activity in which students participate in a career exploration with a partnering business/corporation, an independent research project, or a university-credited course. The Academies are:

- Academy of Health, Medicine and Biology
- Academy of Corporate and Mathematical Innovation
- Academy of Applied Science and Engineering
- Academy of Technology, Media and Communications

Students are required to participate in our STEM pathways Academies during their junior and senior years, but students are permitted to switch Academies after one year.



Academy of Health, Medicine and Biology

The Academy of Health, Medicine and Biology program presents a unique learning environment for students interested in future careers in medicine, biomedical research, and environmental sciences. It provides a broad base introduction to the role of 21st century Biotechnology in Medicine, Research, and the Environment. By combining thought provoking curriculum, labs, engaging dialogue, guest presenters, and immersive field experiences, our students will acquire enhanced leadership, critical thinking and problem solving skills.

Courses prepares students to confidently accept the challenges of the future and move forward in the field of Health, Medicine and Biology with perspective, experience and humility. Enrichment opportunities beyond Academy coursework will be available to interested students, including career exploration, independent research opportunities and college courses.

Academy of Health, Medicine and Biology	Duration	Class Year	Credits
Health and Medicine 1 (Science in Society)	1 semester	Junior	.33
Health and Medicine 2 (Anatomy & Physiology)	1 semester	Junior	.33
Health and Medicine 3 (Microbiology, Genetic)	1 semester	Senior	.33
Laboratory Sciences 1 (Science in Society)	1 semester	Junior	.33
Laboratory Sciences 2 (Microbiology, Genetics)	1 semester	Junior	.33
Laboratory Sciences 3 (Cancer, Immunology)	1 semester	Senior	.33
Ecology 1 (Science in Society)	1 semester	Junior	.33
Ecology 2 (Population Biology, Genetics)	1 semester	Junior	.33
Ecology 3 (Environmental Science)	1 semester	Senior	.33
Career Explorations	1 semester	Senior	.00
Independent Research Project	1 semester	Senior	.00
College/University Course	1 semester	Senior	.00



Academy of Corporate and Mathematical Innovation

The Academy of Corporate and Mathematical Innovation will provide a foundation essential for participation in the global marketplace. These courses will provide the opportunity for creativity and innovation while participating in a hands-on, service learning environment. These courses will inspire students to relate their learning of business and mathematics to other STEM fields.

Academy of Corporate & Mathematical Innovation	Duration	Class Year	Credits
Global Marketing & Business Development	1 semester	Junior	.33
Finance	1 semester	Junior	.33
STEM Inc.	1 semester	Senior	.33
IB Business and Management SL	3 semesters	Jr/Sr	2.00
IB Economics SL	3 semesters	Jr/Sr	2.00
Statistics	1 semester	Junior	.33
Discrete Mathematics	1 semester	Junior	.33
Mathematical Modeling	1 semester	Senior	.33
IB Further Mathematics SL	3 semesters	Jr/Sr	2.00
Career Explorations	1 semester	Senior	.00
Independent Research Project	1 semester	Senior	.00
College/University Course	1 semester	Senior	.00

Academy of Applied Science and Engineering

The Academy of Applied Science and Engineering provides students with the opportunity to develop a greater technical and academic awareness in a chosen area of study. The curriculum in each area of study introduces students to the underlying scientific and engineering concepts steeped in real-world problems.

Embedded in the curriculum is a universal focus on strategic problem solving, the development of oral and written communication skills and an understanding of the importance of ethics in the profession. The courses provided in the Academy of Applied Science and Engineering foster interdisciplinary opportunities for these skills to be used in the hands-on application of science, engineering and mathematics concepts.



The courses in this pathway are intentionally structured to incorporate project-based learning that can be customized to the readiness levels of any learner. With the emphasis on embedded skills and project-based learning a learner can enter a course strand at the beginning of any semester. This structure provides students the opportunity to have a meaningful experience in each content area or to dig deeply into their individual interests.

Academy of Applied Science and Engineering	Duration	Class Year	Credits
Design Engineering 1	1 semester	Junior	.33
Design Engineering 2	1 semester	Junior	.33
Design Engineering 3	1 semester	Senior	.33
Robotics 1	1 semesters	Jr/Sr	.33
Robotics 2	1 semesters	Jr/Sr	.33
Robotics 3	1 semester	Junior	.33
Forensic Science 1	1 semester	Junior	.33
Forensic Science 2	1 semester	Senior	.33
Forensic Science 3	1 semesters	Jr/Sr	.33
Career Explorations	1 semester	Senior	.00
Independent Research Project	1 semester	Senior	.00
College/University Course	1 semester	Senior	.00

Academy of Technology, Media, & Communications

Coursework integrates technology literacy and various modes of communication in an interdisciplinary learning model. These courses focus on studies in design, communications, and technology to bring about global innovation needed in the 21st century.



Academy of Technology, Media, & Communications	Duration	Class Year	Credits
iMedia/Visual Media	1 semester	Junior	.33
Filmmaking & Broadcast Technology	1 semester	Junior	.33
Technological Innovation	1 semester	Senior	.33
Interactive Design	1 semester	Junior	.33
Web Design/Informational Architecture	1 semester	Junior	.33
Gaming	1 semester	Senior	.33
Career Explorations	1 semester	Senior	.00
Independent Research Project	1 semester	Senior	.00
College/University Course	1 semester	Senior	.00

STEM PRACTICUM

The STEM Academy is forging relationships with local businesses and corporations to provide experiential learning opportunities for students. Students will have the opportunity to engage in hands-on learning through site visitations, guest lectures, mentors, and career explorations with our business and corporate partners.

Each Academy culminates in the senior year with an individualized STEM Practicum in which students participate in a career exploration, independent research project or a university-credited course. Below are the descriptions for Practicum options.

Career Exploration

The Career Exploration is for students who wish to explore career opportunities in the STEM field of their choice that is not included in the traditional school curriculum. This program allows students to complete their academic requirements as well as participate in a career experience in their desired STEM field. Students may begin their Career Exploration as early as the end of their junior year. It is designed to help students simultaneously develop critical thinking while also gaining practical career skills. While participating in a STEM Career Exploration, students will attend a partnership at an off-campus location in the community. This provides them with the opportunity to gain experience within our own community and make informed decisions regarding their future career choice in a specialized program to meet their individual needs.



Independent Research Project

In conjunction with a faculty member, students who choose to complete an independent research project will select a specific topic for research in their areas of interest. A faculty member will serve as his/her advisor. This will include scheduling meeting times with the advisor, who, in turn, will assist in finding resources and opportunities for the execution of defined project and define more completely the expectation for the quality of the final outcome that will serve as the basis for assessment of the independent research project.

College/University Course

In partnership with local colleges/universities, The STEM Academy may offer students the opportunity to enroll in a college level course. Students participating in college course work will receive college credit per the participating institution and Practicum recognition only. No credit for IB courses for participation will be awarded. Students will be responsible for tuition, fees and course materials. Students should investigate the feasibility of credit transfers from partnering university to the student's post-high school university of choice. Each university has processes and procedures and practices for accepting credits from other universities.



How can you partner with the STEM Academy?

1. **Speaking Opportunities** - The Academy is looking for field professionals who are willing to introduce their professions and career journeys to students. Bringing career relevancy to the Academy is integral for students to draw connections between the classroom and the workforce.
2. **Job Shadow/Internships** – Junior and Senior students will have the option to participate in a real life career experience in a field of interest. This experience can vary in length and intensity from a job shadow to a full internship depending upon the partner and discipline.
3. **Externships** - Experiential learning opportunities are not only vital for the students at the Academy but also for our instructional staff. Academy instructors would shadow field professionals to identify current practices and future needs in various jobs. Ongoing communication between employers and the Academy is a key tenet for the success of our students.
4. **Volunteer teachers** - The Academy is looking for field professionals who are willing to assist in the teaching of topics and/or units of instruction. Bringing relevancy to the classroom is integral for students to draw connections between the classroom and workforce.
5. **Mentorship** - Utilizing the tremendous amount of intellectual capital in our community to help guide and advise students for their future. The Academy is looking for individuals who are willing to mentor students in a wide range of areas.
6. **Applied Problem Sets** - STEM Academy instructors are always seeking real world problems to apply in the classroom. Businesses and instructors would create activities that are engaging and relevant to the students.
7. **Equipment Donations** - With the fast pace of technology, education is unable to keep up in many instances. Donated equipment from businesses and corporations provide access for students to utilize as part of daily instruction and accelerate their learning.

Effort Creates Intelligence

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