



ChemForAll: Radicalizing STEM career access through transformative 5-12+ Chemistry Curriculum

Building strategic pathways in 6-14 STEM Education for ALL interested STEM Scholars in public education, with an emphasis on improving personal, public and community health in all boroughs of New York City.



Access to Foundational Math & Science Coursework

What's the limiting factor?

Who are the stakeholders?

Why don't all students receive Chemistry courses?



POLICY PROPOSAL

Create systems of study for STEM specialization in 6-14 classrooms, that directly focus student interests in the science coursework at a young age. Remove traditional REGENT's requirements in Humanities, for those students wishing to pursue STEM diplomas. (And vice versa?) Replace Regents k-12 with Alternative Assessment (Portfolio-based) k-10 & Specialized 11-12 (+2) Subject-inspired tracking.



Benefits & Challenges

PROS

- Early prep for rigorous STEM
- Strengthen science specific curriculum
- Motivation for students to specialize early

CONS

- Minimizes Humanities
- Non-traditional 4-yr University prep
- Funding challenges



Possibilities

Current preK-12 System

- Curricular Infusion
- After School STEM Tutoring
- Weekend Support
- Immersion STEM Pedagogy

Radical Shifts to New Systems

- preK-10 foundations
- +2/pre-university/O-level



CHEMISTRY INFUSION CURRICULUM

Co-curricular

Chemistry class for everyone



POSSIBLE POLICY SHIFTS

- Funding to middle school science programs
- Certifying elementary teachers in science education
- Funding to PREP for PREP
- District 75 exceptionally gifted- Science
- Multi-Language Learners
- Gifted and Talented Learners



Calandra-Hecht Bill: NYS Education Law

NYS Education Law section 2590-h(1)(b) incorporating the original bill, “Calandra-Hecht,” that created the current specialized high schools admission system: The Chancellor has the power and duty to

“Establish and maintain special high schools which shall at least include The Bronx High School of Science, Stuyvesant High School, Brooklyn Technical High School, Fiorello H. LaGuardia High School of Music and the Arts — and such further high schools which the Board of Education may designate from time to time.

(b) Admissions to The Bronx High School of Science, Stuyvesant High School and Brooklyn Technical High School and such similar further special high schools which may be established shall be solely and exclusively by taking a competitive, objective and scholastic achievement examination, which shall be open to each and every child in the City of New York in the eighth or ninth year of study, in accordance with the rules promulgated by the N.Y.C. Board of Education, without regard to any school district wherein the child may reside. No candidate may be admitted to a special high school unless he has successfully achieved a score above the cut-off score for the openings in the school for which he has taken the examination.”



Access to Biology/Chemistry & Physics Coursework

Most city students [never come near a physics classroom](#). Although it is the keystone discipline of modern science and technology, the subject is barely taught in the public high schools, outside a select few programs such as those at the specialized schools and elsewhere.

That lack of opportunity hits with greatest force in schools where most students are black or Latino, according to [Angela Kelly](#), a professor of science education at Stony Brook University.

“If a student wants to pursue a college major in life science, engineering, or health, physics is really a gateway course for being able to be succeed,” said Dr. Kelly. “Having limited opportunity to learn physics has many social and economic ramifications.”

<https://www.nytimes.com/2018/06/08/nyregion/about-shsat-specialized-high-schools-test.html>



The NEED

- Student Need
- Social Need science-informed
- Public Health
- STEM job trends



CONSIDERATIONS for Rapid STEM Expansion

<https://k16.cuny.edu>

- STEM Teacher Training
- STEM/CHEM After School
- ChemEthics
- STEM Immersion Pedagogies



School Diversity Advisory Group

<https://www.schools.nyc.gov/about-us/vision-and-mission/diversity-in-our-schools/school-diversity-advisory-group>



GIFTED & TALENTED STEM in All NYC Public Schools

- **Where is NYC's plan for 'gifted & talented' admissions?**

<https://ny.chalkbeat.org/2021/10/5/22711687/nyc-gifted-talented-reform-delayed>

- **Subject:** NYC eliminates 'gifted' test for kindergartners, overhauls program - Chalkbeat New York

<https://ny.chalkbeat.org/2021/10/8/22716211/gifted-talented-test-segregation-nyc-overhaul>



Demographics of NYC current Gifted & Talented programs

New York City's gifted programs have been a lightning rod of controversy.

Classrooms are deeply segregated and the focus for reform. While Black and Latino students make up almost 60% of all kindergartners citywide, their enrollment in gifted programs is only 14%.

The greatest share of students in gifted classes are Asian American, at 43%. White students are also overrepresented at 36% of enrollment. Just over a quarter come from low-income families, compared with almost 70% citywide. There are almost no students with disabilities or who are learning English as a new language in gifted classrooms.



ELEMENTARY SCHOOL STEM Recommendations

- Specialized Teacher Training
- Opportunities for High School credit
- After School Immersion Programs



SECONDARY SCHOOL STEM Recommendations

- Advanced Placement & Honors STEM Classes for all
- After school accelerated Biology, Chemistry
- Saturday/weekend rapid immersion experience
- Mobile Environmental/Biology/Science Lab
- Access to public specialized STEM schools through SHSAT Tutoring available to ALL, or revised entrance qualifications for STEM studies



Alternative programs

1. Afterschool
2. Career Development and Occupational Studies
3. The Green Book
4. Career & Technical Department of EDucation NYC
5. Pathways to Graduation DOE



Need for Chem4All

- Teaching science and math for all learners
- Project-based learning
- ESL learners.... Don't need English to be a brain surgeon
- Audi/Visual Learning in Chemistry/Biology/Physics
- Immersion Pedagogy



Graduation Requirements

8th Grade

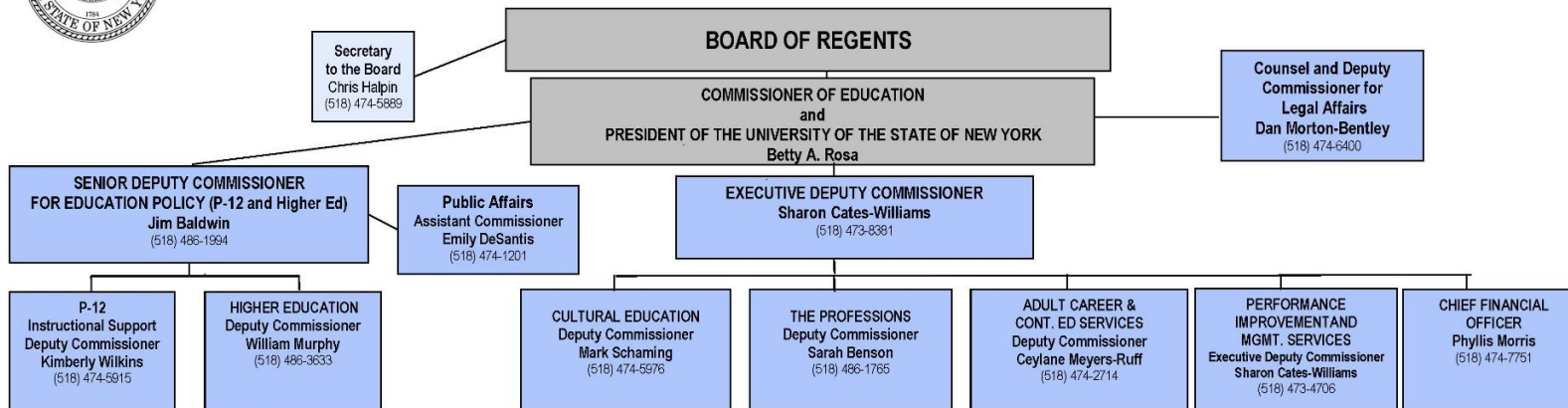
12th Grade

Pre-university



September 14, 2021

NEW YORK STATE EDUCATION DEPARTMENT ORGANIZATION CHART





New York State Department of Education

Improving Educational Outcomes

New York's public schools spend more per pupil (\$23,091) than any other state in the country— almost double the national average (\$12,201). While the level of spending is important, Governor Cuomo has initiated several programs to improve outcomes within the State's education system.

<https://www.budget.ny.gov/pubs/archive/fy22/ex/agencies/appropdata/EducationDepartmentState.html>

Category	2019-20 School Year (millions)	2020-21 School Year (millions)	Change	
			Dollar (millions)	Percent
School Aid	\$27,724	\$28,550	\$826	3.0

Table 7: School Aid Increase

Category of Increase	Change (millions)
Foundation Aid	\$504
\$50 Million Community Schools Set-aside	
Targeted High-Need District Foundation Aid	\$200
Reimbursement for Expense-Based Aids / Other	\$72
Expanded Prekindergarten for Three- and Four-Year-Olds	\$15
Empire State After School Program	\$10
Early College High Schools	\$6
Master Teachers Program	\$2
Curriculum on Diversity and Tolerance	\$1
STEM Entrepreneur	\$1
Other Education Initiatives	\$16
School Aid Increase	\$826



STEM Pathways in New York City Public Systems

NYC Department of Education STEM Pathways:

- New York City Career & Technical Education
<https://cte.nyc/web/about-cte/school-programs>
-



STEM Pathways in New York City Public Systems

CUNY Partnerships

- Early College Initiative at CUNY <https://k16.cuny.edu/eci/our-schools/>
- Math/Science Partnerships Network MSPnet
<http://mspnyc2.mspnet.org>



Bloomberg's Legacy

A STEP AHEAD

TO BRIDGE the gap between public high school and college and careers, the city has begun opening STEM-focused high schools that continue through two years of college, or so-called “9-14” schools. Kids will have the opportunity to graduate with an associate’s degree from:

- **PATHWAYS IN TECHNOLOGY EARLY COLLEGE HIGH SCHOOL**, in Brooklyn. The flagship operation is a partnership with IBM, which guarantees graduates will be first in line for a job.

- **ENERGY TECH HIGH SCHOOL**, in Queens. In partnership with Con Edison and National Grid, Energy Tech opened in September.
- **HEALTH, EDUCATION AND RESEARCH OCCUPATIONS**

- HIGH SCHOOL**, in the Bronx. It opened in partnership with Montefiore Medical Center in September.
- **OPENING IN 2014 IN MANHATTAN**, a partnership with Microsoft and New

- York-Presbyterian Hospital that will focus on information technology in the health-care industry.
- **OPENING IN 2014 IN QUEENS**, a partnership with business technology firm SAP that

- will focus on computer science and tech.
- **OPENING IN 2014 IN MANHATTAN**, a partnership with the American Association of Advertising Agencies to teach marketing and design.

SOURCE: EDUCATION DEPARTMENT



ROLE OF NON-PROFIT SECTOR

Private Philanthropy in New York City

Non-Profit Organizations in New York City

<https://stemkidsnyc.org>

<https://sloan.org/programs/new-york-city-program>

<https://philanthropynewyork.org/news/why-stem-key-future-innovation-needs-funding-now>

<https://stemteachersnyc.org/impact/>



By All Means Leadership Alliance

<https://www.bamlainc.org>



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Youth Leadership Development

By All Means Leadership Alliance Inc.(BAMLA), is a nonprofit, 501c3 that develops young people of color into leaders who do service within their communities. We foster the growth and well-being of people through leadership development, educational initiatives, internships, and social justice programs.



CASE STUDY

- The Bronx k-5 Science content and teaching
- Bronx High School of Science middle school feeder study
- Matriculation rates for high school students from the Bronx is STEM GPA and STEM undergraduate study
- Middle School feeder schools in surrounding districts
- Bronx High School of Science Demographics



Next Steps

- Afterschool/Weekend STEM Prep Program
- 3-5 Students
- 1-year Middle School Prep
- Community program in Kingsbrindge/Inwood area of the Bronx
- Possible model for STEM Teacher/Tutors to model
- Pitch to Dinowitz