Assemblywoman Donna Lupardo, 126thAD

August 10, 2012

Thank you for allowing me to submit testimony that focuses primarily on student achievement and teacher preparedness regarding career and technical education (CTE) and science, technology, engineering and math (STEM). I understand the Regents are considering creating two new "non-traditional" pathways to graduation: one in CTE, and the other in STEM. I strongly support both of these ideas.

As Chair of the Legislative Commission on Science and Technology, I regularly confront the need for alternative pathways as I speak with students, educators and businesses. I am convinced that we are missing critical opportunities to prepare our school-aged youth for the current high-demand world of work especially in an environment that requires a solid preparation in the skills involved with emerging technologies. For example, in spite of the growing call for CTE, according to the latest published figures available from the State Education Department, statewide CTE enrollments have stayed the same. Given what we know about the importance of career and technical education, this should not be the case. I also recently learned about a school district on Long Island that no longer sends students to BOCES because of the expense, and the pressure they are under for students to pass standardized tests. This development should get everyone's attention.

The focus of the recent past has been on accountability which is, of course, extremely important, but testing alone is not the answer. Testing often tells us of failure after the fact, when it is too late to get the classroom time back. The goal of CTE is to provide students with a unique pathway to postsecondary education and careers by exposing them to technical education and practical problem solving. The time has come to create a CTE pathway to develop and utilize the skills that will both keep students engaged and prepare them for their futures whether they are in the workforce immediately after graduation or after a two-year, four-year, or post-graduate degree

In addition to being cognizant of and responsive to labor market demands, another crucial justification for alternative pathways to diplomas is engaging students who otherwise may be uninvolved in and uncommitted to classwork in a traditional pathway to their diplomas. Students cannot be educated if they don't stay in school or if they are not engaged when they are in school. We lose too many students before graduation, whether or not they actually stay in school, and getting those students interested in learning who may not be engaged in traditional academic pedagogy is critical. I also hope it would elevate the status of these careers, removing what students often experience as a stigma associated with CTE and their involvement with BOCES for example.

A widely recognized and cited 2011 study on this issue yielding extremely valuable findings and recommendations is Pathways to Prosperity: Meeting the Challenge of Preparing Young Americans for the 21st Century. The Report was prepared by the Pathways to Prosperity Project of the Harvard Graduate School of Education. Central to its thesis is the following statement:

[T]here are profoundly troubling signs that the U.S. is now failing to meet its obligation to prepare millions of young adults. In an era in which education has never been more important to economic success, the U.S. has fallen behind many other nations in educational attainment and achievement. Within the U.S. economy, there is also growing evidence of a "skills gap" in which many young adults lack the skills and work ethic needed for many jobs that pay a middle-class wage. Simultaneously, there has been a dramatic decline in the ability of adolescents and young adults to find work.

As the Report highlights the "widening skills and opportunity gaps" in education today, it makes the observation that not everyone needs a B.A. to get a good job. In fact, it states that many jobs do not require one. However, the fact that one has to at least finish high school is undisputed, but according to the Report, approximately one million students drop out and not just because they "struggle academically." In fact, "large numbers say they dropped out because they felt their classes were not interesting, and that high school was unrelentingly boring."

As reported in the Harvard study, some states are responding to this by introducing alternative pathways to diplomas, and this is what I hope we do in New York. For example:

- Massachusetts has a statewide network of regional vocational technical high schools that has been very successful. Students in these schools spend half their time in career education with integrated academics. Far fewer students drop out of these schools than the traditional ones.

- California has over 500 career academies ("partnership academies") which incorporate "rigorous academics with demanding technical education and work-based learning."

- Florida has enacted legislation that "requires new CTE programs be designed to meet a real workforce need, and that CTE students should earn high-quality industry-recognized certifications, so they are more easily employable."

- Washington State has integrated remedial English and math skills training into college-level CTE programs "in fields ranging from auto repair to nursing."

Clearly, a CTE pathway will need to be carefully administered to avoid the potential for students being "tracked" inappropriately. And CTE teachers will need substantial professional development and integration into the STEM fields as well.

Regarding a STEM pathway, we are lagging behind other states and countries. The President's Council of Advisors on Science and Technology in its 2010 report Prepare and Inspire: K-12 Education in Science, Technology, Engineering, and Math (STEM) for America's Future states, "STEM education will determine

whether the United States will remain a leader among nations and whether we will be able to solve immense challenges in such areas as energy, health, environmental protection, and national security."

One area where we are really falling short is in teacher preparedness. A 2010 national study showed that 9% of science teachers annually left the profession in 2008–09. Attrition rates from 1988 to 2005 ranged between 5.5 and 7.5%. The main reasons science teachers gave for leaving the profession were maximum potential salary, student discipline problems, and few opportunities to receive useful content-focused professional development.

Insufficient teacher professional development, with its concomitant increase in teacher attrition, will become an even bigger problem with broad ramifications as the new Next Generation Science Standards (NGSS), currently under development, are implemented. The new standards are intended to move K-12 instruction away from the content-driven, often frustrating, passive learning experiences toward a model that develops students' scientific abilities and reflects what scientists actually do. Most middle and high school physical science teachers, however, are ill-equipped to implement such fundamental change since they have not honed their own science process skills and they are often working with 19th-century content.

As such, they have much to learn themselves before they can even begin to take on the challenge of effectively cultivating those scientific skills in their students, as will be mandated by the NGSS. Without an increased focus on professional development, implementing the promising new standards could be thwarted by the inability of teachers to teach to them. It is all-important to recognize that before you can change the classroom and the experience for the students, you need to change the teacher.

A high-quality laboratory program will be needed to successfully implement the NGSS, with its strong focus on science and engineering process skills development. One of its seven conclusions in America's Lab Report: Investigations in High School Science, released in 2005, states that for most students, "the quality of current laboratory experiences is poor." The report points out that the limited lab activities available "do not help them to fully understand science process."

Four measures are necessary to reforming K-12 science education and ensuring the future of a STEM-based economy:

-attracting people into the profession of science teaching,

-reforming the K-12 curriculum to make it more reflective of the process of science,

-reforming teacher training and providing professional development to current teachers that improves their content knowledge and science process skills,

-creating laboratory experiences consistent with the NGSS model for teaching and learning science.

I would also like to bring an urgent matter to your attention regarding the CNS Institute for Physics Teachers (CIPT) at Cornell University. A model program since 2001, CIPT will run out of funding next month and will be forced to cease operations.

Since its start, CIPT has been helping to build the STEM workforce by improving high school physics education and enhancing student interest in science. Approximately 1800 teachers worldwide have participated in more than 80 intensive training workshops, and more than 230 teachers have attended CIPT graduate courses.

CIPT is ideally positioned to help NYS implement the new Next Generation Science Standards (NGSS) with fidelity. The CIPT director was one of about 30 individuals from NYS chosen to serve on the NYS leadership team for the NGSS development. Unfortunately CIPT was funded from a non-renewable NSF grant which sunsets September 30, 2012. This valuable resource, ideally suited to help meet these very challenging educational demands being placed upon NYS, is being eliminated when needed most.

A model for efficient NY statewide implementation of CIPT-led teacher professional development for NGSS compliance could be developed in cooperation with NYCDOE, the BOCES regions, and through regional activities of STANYS (Science Teachers Association of NYS).

(The previous remarks about STEM education drew heavily from Julie Nucci's article "Strengthening K-12 science education through teacher development," Physics Today, March 2012. She is also the Director of CIPT.)

Finally, I would be remiss if I did not also express my concern about achieving a fair foundation aid formula, one that considers the circumstances of low wealth, high need districts like mine. These districts have unfortunately suffered the brunt of the cuts while many wealthier districts were spared, solidifying basic inequities, as was predicted. Fully implementing and adequately funding quality prekindergarten programs would be one of the most important means of closing the achievement gap for districts in distress. We also have to seriously confront what educational and financial insolvency will mean for our schools as they confront a property tax cap, along with crippling mandates. With 30,000 NY educators laid off in the last three years, and numerous electives, sports, advance placement classes, etc. eliminated, we have an obligation to help.

Thank you for your time and commitment.