

**TASK CARD #1: Changing expectations for mathematics achievement**

Today's children are growing up in a world very different from the one even 15 years ago. Seismic changes in the labor market mean that we are living and working in a knowledge-based economy—one that demands advanced literacy and Science, Technology, Engineering and Mathematics (STEM) skills, whether for application in the private or public sector. Today, information moves through media at lightning speeds and is accessible in ways that are unprecedented; technology has eliminated many jobs while changing and creating others, especially those involving mathematical and conceptual reasoning skills. One characteristic of these fast-growing segment of jobs is that the employee needs to be able to solve unstructured problems while working with others in teams. At the same time, migration and immigration rates around the world bring diversity to schools and neighborhoods. The exponential growth in interactions and information sharing from around the world means there is much to process, communicate, analyze and respond to in the everyday, across all settings. For a great majority of jobs, conceptual reasoning and technical writing skills are integral parts to the daily routine.

To prepare students for the changes in the way we live and work, and to be sure that our education system keeps pace with what it means to be mathematically literate and what it means to collaboratively problem solve, we need a different approach to daily teaching and learning. We need content-rich standards that will serve as a platform for advancing children's 21<sup>st</sup>-century mathematical skills—their abstract reasoning, their collaboration skills, their ability to learn from peers and through technology, and their flexibility as a learner in a dynamic learning environment. Students need to be engaged in dialogue and learning experiences that allow complex topics and ideas to be explored from many angles and perspectives. They also need to learn how to think and solve problems for which there is no one solution—and learn mathematical skills along the way.

**TASK CARD #2: Increasingly Diverse Learner Populations**

The need for a deeper, more innovative approach to mathematics teaching comes at a time when the system is already charged with building up language skills among the increasingly diverse population. Students who are English Language Learners (ELLs)/Multilingual Learners (MLLs) now comprise over 20% of the school-age population, which reflects significant growth in the past several decades. Between 1980 and 2009, this population increased from 4.7 to 11.2 million young people, or from 10 to 21% of the school-age population. This growth will likely continue in U.S. schools; by 2030, it is anticipated that 40% of the school-age population in the U.S. will speak a language other than English at home. <sup>(1)</sup> Today, in schools and districts across the U.S., many students other than those classified as ELLs are learning English as an additional language, even if not in the initial stages of language development—these children are often described as “language minority learners.” Likewise, many students, large numbers of whom are growing up in poverty, speak a dialect of English that is different from the academic English found in school curriculum.

Each of these groups—ELLs/MLLs, language minority learners, and students acquiring academic English—often struggle to access the language, and therefore the knowledge that fills the pages of academic texts, despite their linguistic assets. Therefore, the context for this new set of Mathematics Standards is that there is a pressing need to provide instruction that not only meets, but exceeds standards, as part of system-wide initiative to promote equal access to math skills for all learners while capitalizing on linguistic and cultural diversity.

All academic work does, to some degree, involve the academic language needed for success in school. For many students, including ELLs/MLLs, underdeveloped academic language affects their ability to comprehend and analyze texts, limits their ability to write and express their mathematical reasoning effectively, and can hinder their acquisition of academic content in all academic areas in which learning is demonstrated and assessed through oral and written language. If there isn't sufficient attention paid to building academic language across all content areas, students, including ELLs/MLLs, will not reach their potential and we will continue to perpetuate achievement gaps. The challenge is to design instruction that acknowledges the role of language; because language and knowledge are so inextricable.

In summary, today's children live in a society where many of their peers are from diverse backgrounds and speak different languages; one where technology is ubiquitous and central to daily life. They will enter a workforce and economy that demands critical thinking skills, and strong communication and social skills for full participation in society. This new society and economy has implications for today's education system—especially our instruction to foster a deeper and different set of communication and critical thinking skills, with significant attention to STEM.

### **TASK CARD #3: Students with Disabilities and the Standards**

One of the fundamental tenets guiding educational legislation (the *No Child Left Behind Act*, and *Every Student Succeeds Act*), and related policies over the past 15-years, is that all students, including students with disabilities, can achieve high standards of academic performance. A related trend is the increasing knowledge and skill expectations for PreK-Grade 12 students, especially in the area of reading and language arts, required for success in postsecondary education and 21<sup>st</sup> Century careers. Indeed, underdeveloped literacy skills have profound academic, social, emotional, and economic consequences for students, families, and society.

At the same time, the most recently available federal data presents a portrait of the field reflecting both challenges and opportunities.

Students served under IDEA, Part B: During the 2012-13 school year, there was a total of 5.83 million students with disabilities, ages 6-21; an increase from 5.67 million in 2010-11.

Access to the general education program: More than 60 percent (62.1%) of students, ages 6 through 21 served under IDEA, Part B, were educated in the regular classroom 80% or more of the day, up from 60.5% in 2010-11.

Participation in state assessments: Between 68.1 and 84.1 percent of students with disabilities in each of grades 3 through 8 and high school participated in the regular state assessment in reading based on grade-level academic achievement standards with or without accommodations.

English language arts proficiency: The median percentages of students with disabilities in grades 3 through 8 and high school who were administered the 2012-13 state assessment in reading based on grade-level academic achievement standards who were proficient ranged from 25.4 to 37.3 percent.

Graduation: Over sixty percent (65.1%) of students with disabilities graduated with a regular high school diploma.

Overall, the number of students with disabilities is increasing nationwide, as is their access to the general education curriculum, and participation in the state ELA and mathematics assessments. Attaining proficiency and graduating with a regular high school diploma are areas where significant improvements are needed.

Therefore, each student's individualized education program (IEP) must be developed in consideration of the State learning standards and should include information for teachers to effectively provide supports and services to address the individual learning needs of the student as they impact the student's ability to participate and progress in the general education curriculum. In addition to supports and services, special education must include specially designed instruction, which means adapting, as appropriate, the content, methodology or delivery of instruction to address the unique needs that result from the student's disability. By so doing, the teacher ensures each student's access to the general education curriculum so that he or she can meet the learning standards that apply to all students. The [Blueprint for Improved Results for Students with Disabilities](#) focuses on seven core evidence-based principles for students with disabilities to ensure they have the opportunity to benefit from high quality instruction and to reach the same academic standards as all students. For additional information, please see the Office of Special Education's field advisory: [Blueprint for Improved Results for Students with Disabilities](#).

### **TASK CARD #4: Understanding the NYS Next Generation Mathematics Learning Standards (2017)**

The *NYS Next Generation Mathematics Learning Standards (2017)* define what students should understand and be able to do as a result of their study of mathematics. To assess progress on the Standards, a teacher must assess whether the student has understood what has been taught and provide opportunities where a student can independently use and apply this knowledge to solve mathematical problems in similar or new contexts. While procedural skills are relatively straightforward to assess, teachers often ask: what does mathematical understanding look like?

One hallmark of mathematical understanding is the ability to justify, in a way appropriate to the student's mathematical maturity, why a particular mathematical statement is accurate or where a mathematical rule comes from. Correctly using language to articulate mathematical understanding plays a part in this justification. Making the distinction between mathematical understanding and procedural skill is critical when designing curriculum and assessment; both are important for the mastery of these standards. That is, there is a world of difference between a student who can summon a mnemonic device to expand a product such as  $(a + b)(x + y)$  and a student who can explain what the mnemonic represents as a process for systematically approaching algebraic problems. The student who can explain the rule understands the mathematics, and may have a better chance to succeed at a less familiar task, such as expanding  $(a + b + c)(x + y)$ .

The Standards set grade-specific standards but do not define the intervention methods or materials necessary to support students who are well below or well above grade-level expectations. It is also beyond the scope of the Standards to define the full range of supports appropriate for English Language Learners (ELLs)/Multilingual Learners (MLLs) and for Students with Disabilities. However, the department ensured that teachers of English Language Learners (ELLs)/Multilingual Learners (MLLs) and Students with Disabilities participated in the revision of the standards. The New York State Education Department (NYSED) has created two statewide frameworks, the [Blueprint for Improved Results for Students with Disabilities](#) and the [Blueprint for English Language Learner Success](#), aimed to clarify expectations and to provide guidance for administrators, policymakers, and practitioners to prepare ELLs/MLLs and Students with Disabilities for success. These principles therein the frameworks are intended to enhance programming and improve instruction that would allow for students within these populations to reach the same standards as all students and leave school prepared to successfully transition to post school learning, living and working.

No set of grade-specific standards can fully reflect the variation in learning profiles, rates, and needs, linguistic backgrounds, and achievement levels of students in any given classroom. When designing and delivering mathematics instruction, educators must consider the cultural context and prior academic experiences of all students while bridging prior knowledge to new knowledge and ensuring that content is meaningful and comprehensible. In addition, as discussed above, educators must consider the relationship of language and content, and the vital role that language plays in obtaining and expressing mathematics content knowledge. The standards should be read as allowing for the widest possible range of students to participate fully from the outset, along with appropriate adaptations to ensure equitable access and maximum participation of all students.

