

# Greater Southern Tier STEM Education

Preparing students for the 21<sup>st</sup> Century

SCIENCE | TECHNOLOGY | ENGINEERING | MATH



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## Mission:

To re-energize, revitalize, and refocus attention, interest and understanding of the embedded importance of science, technology, engineering, and math (STEM) to life-long learning and success. To create a regional STEM “pipeline” that results in college, and career ready students that are rich in STEM and 21st Century skills.

## Vision:

Our region will be a model in generating math, science, technology and engineering interest, excitement and marketable skills.

## Outcomes:

- 1) A significant increase in college and career ready high school graduates capable of real world application, cross disciplinary connections, problem solving and critical thinking.
- 2) Implemented inquiry based programs that reduce achievement gaps and enhance student mastery of Common Core standards in ELA, Math and Science.
- 3) Implemented STEM support network that leverages regional partnerships and community engagement to meet individualized student needs.
- 4) Implemented STEM career and college pathways based on student engagement, purposeful student capacity building and continuous learning systems.
- 5) A job embedded professional development system that supports continuously improving teacher and administrative capacity to deliver STEM capable students.

## Rationale:

Currently, average Greater Southern Tier student performance in relation to New York’s measures for college and career readiness mirror state averages for graduation and Regents level results (i.e. 34 percent meet the standards out of the 75 percent of our students who graduate with a diploma). Department of Labor projections for the area economy project that 80 percent of new job opportunities will require some technical training. Local employers already lament the lack of a deep, qualified labor pool, and remedial rates for local community colleges remain well above 50 percent. We believe that implementing the GST Regional STEM Program will help our students remain competitive in a global economy requiring creativity, non-routine problem solving, collaboration, applied learning and persistence.

### **Guiding Beliefs:**

- Common Core Learning Standards, Next Generation Science Standards and STEM are instructionally aligned
- Interdisciplinary, inquiry and project based approaches to instruction are essential to meeting the STEM mission
- Full STEM implementation will require significant systemic changes to student expectations, instructional delivery and student assessment
- Time for mastery of core academic skills and the necessary habits of mind is a variable requiring changes to the annual calendar and daily schedule
- A continuum of engaging STEM career pathways is necessary to create greater rigor and relevance for students earning high school diplomas
- Job embedded professional development and support structures for teachers and administrators in an evolving real world and virtual environment is essential
- Fidelity of implementation is critical to achieving desired student outcomes
- Community understanding and engagement are critical to producing desired STEM outcomes
- The continued collaborative effort among regional school districts, BOCES, colleges and businesses is critical to successful achievement of the mission

### **Program Features (2013-18):**

The GST STEM Program believes that the implementation of the NGSS in concert with the Common Core Learning Standards will further our efforts toward increasing students' engagement in, capacity for and continuity of STEM learning.

The GST STEM Program, in collaboration with national and state resources, area school districts, regional employers, community agencies and regional post-secondary institutions, will focus on the following features to achieve this:

- Regional program continuity with inquiry based STEM instruction in grades K-12
- Job-embedded professional development and monthly STEM training for cohort groups of teachers in grades K-12
- Opportunities for teachers to pilot innovative curriculum and STEM materials
- Regents-assessed science courses delivered using inquiry based instruction
- STEM modules aligned with NGSS that support math and ELA Common Core Standards
- STEM Career Pathways using an Early College High School model
- Alignment of Extended Day experiences with Common Core/NGSS expectations
- Collaboration with regional colleges and universities for teacher preparation, program evaluation and resource allocation

### **Observations and recommendations from Higher Ed.:**

- The GST STEM Program is committed to tracking and studying the incremental change in student achievement and choice in a variety of ways over time and is partnering with Syracuse University in this work. Additionally, the region views its work as an ongoing R & D effort, with results that will be used to enhance programming and measure impact.
- The integration of higher education is an important aspect of this initiative. Partners include Syracuse University, Alfred University and Corning Community College.
- Our STEM program is becoming increasingly more important in the eyes of higher education. At a recent full-faculty retreat at Syracuse, a professor led the entire group through an experience in inquiry based engagement that was nearly identical to the trainings that the GST STEM Program curriculum mentors lead.
- Some higher ed. faculty have noted that only about 65 percent of students are capable and ready for the "rigors of study" in engineering. This leaves many who are not. As one engineering faculty stated, "It is important that the high schools, as well as we at the college, engage students in the act of inquiry, of problem solving. However, it is not enough to simply drop an egg from a roof and see what happens. Study is more than that." This is something that regional professional development has stressed often with teachers. The incorporation of NGSS supports science and engineering practice, inquiry and problem solving.