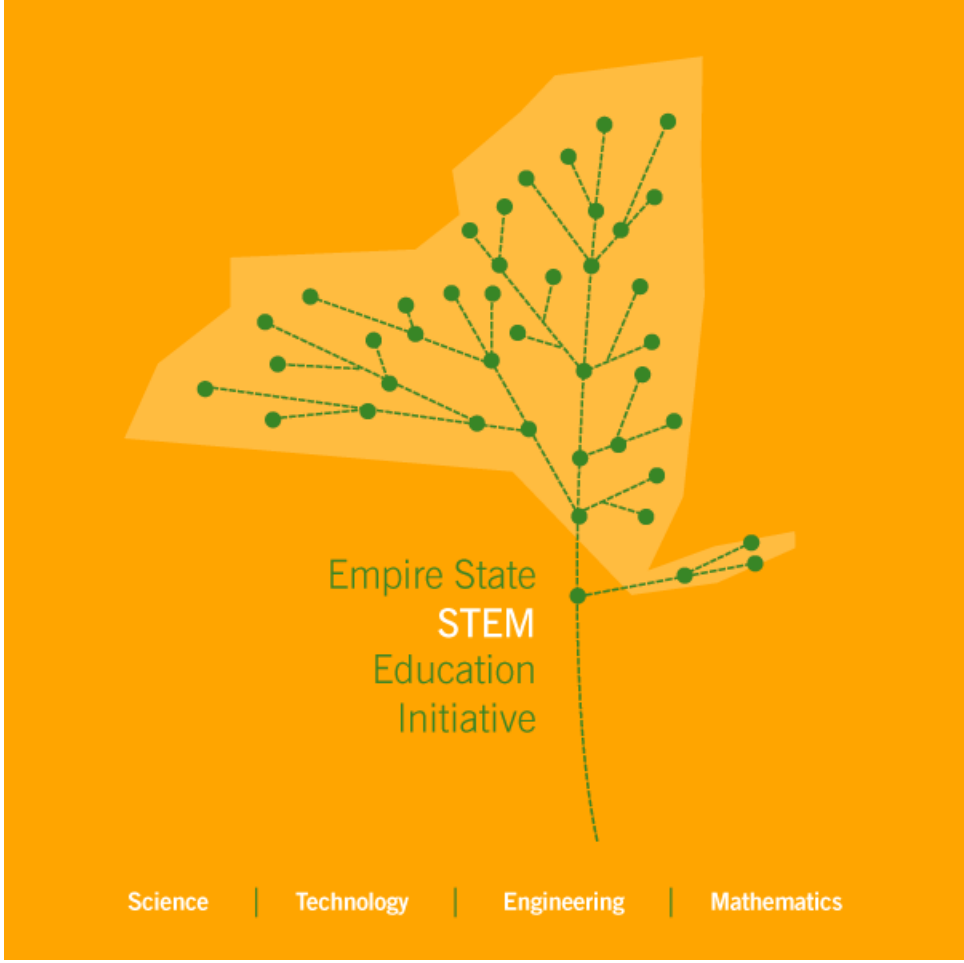
Progressive Dialogue Overview



Margaret Ashida
Project Director
Empire State STEM Education Initiative
Rensselaer Polytechnic Institute

Rensselaer

Agenda

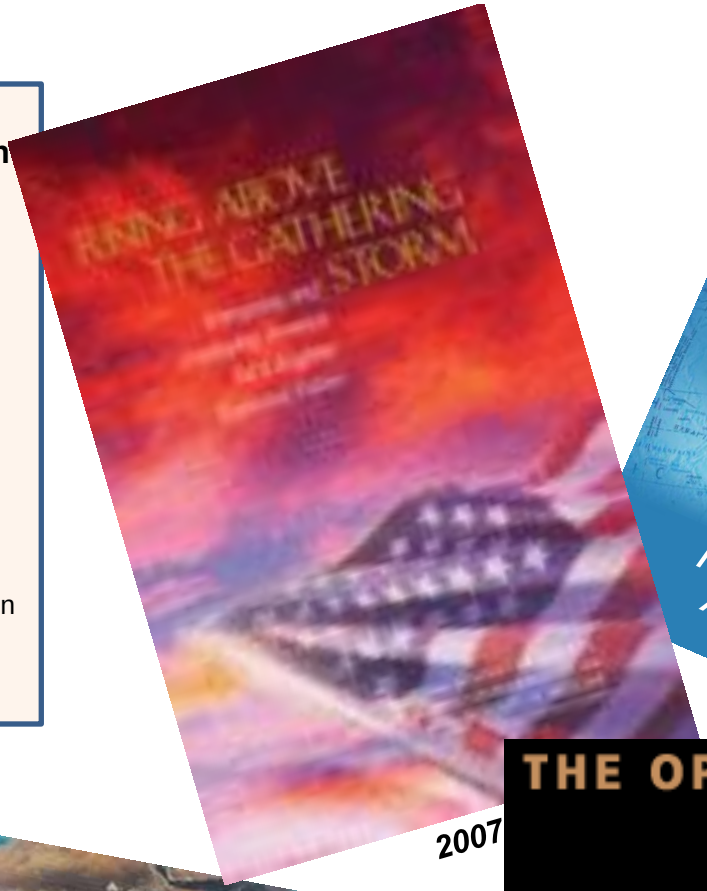
- Why STEM, why now?
- Progressive Dialogue approach
- Preliminary findings
- Actions underway
- Next steps

Why STEM?

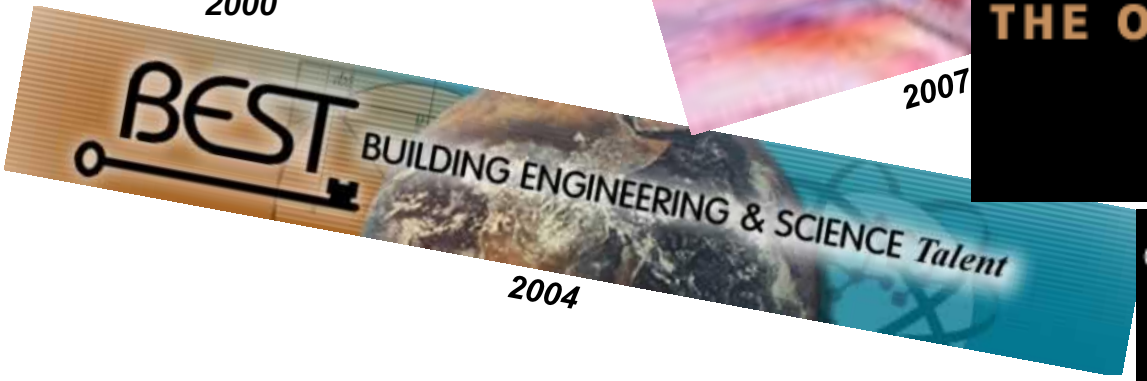
Land of Plenty - Diversity as America's Competitive Edge in Science, Engineering and Technology

Report of the Congressional Commission on the Advancement of Women and Minorities in Science, Engineering and Technology Development

2000



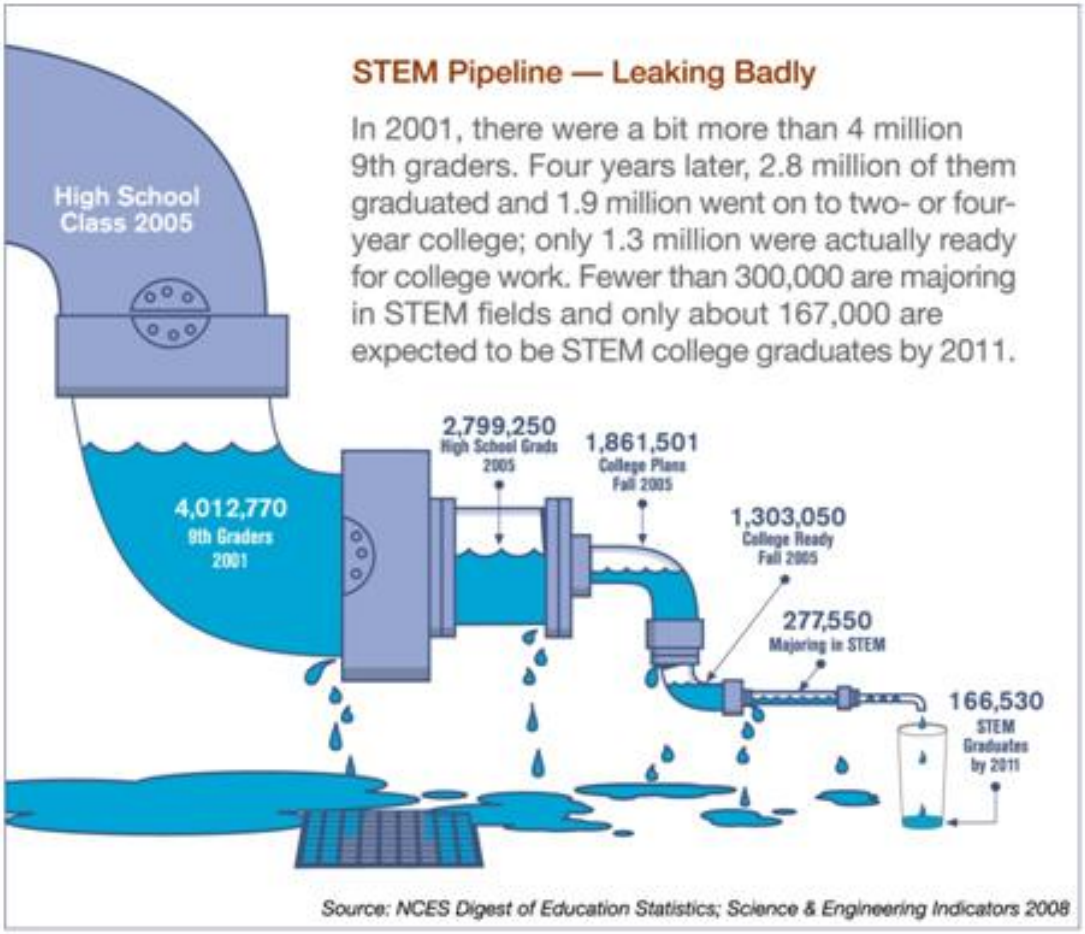
2007



2004

2009

Why now?

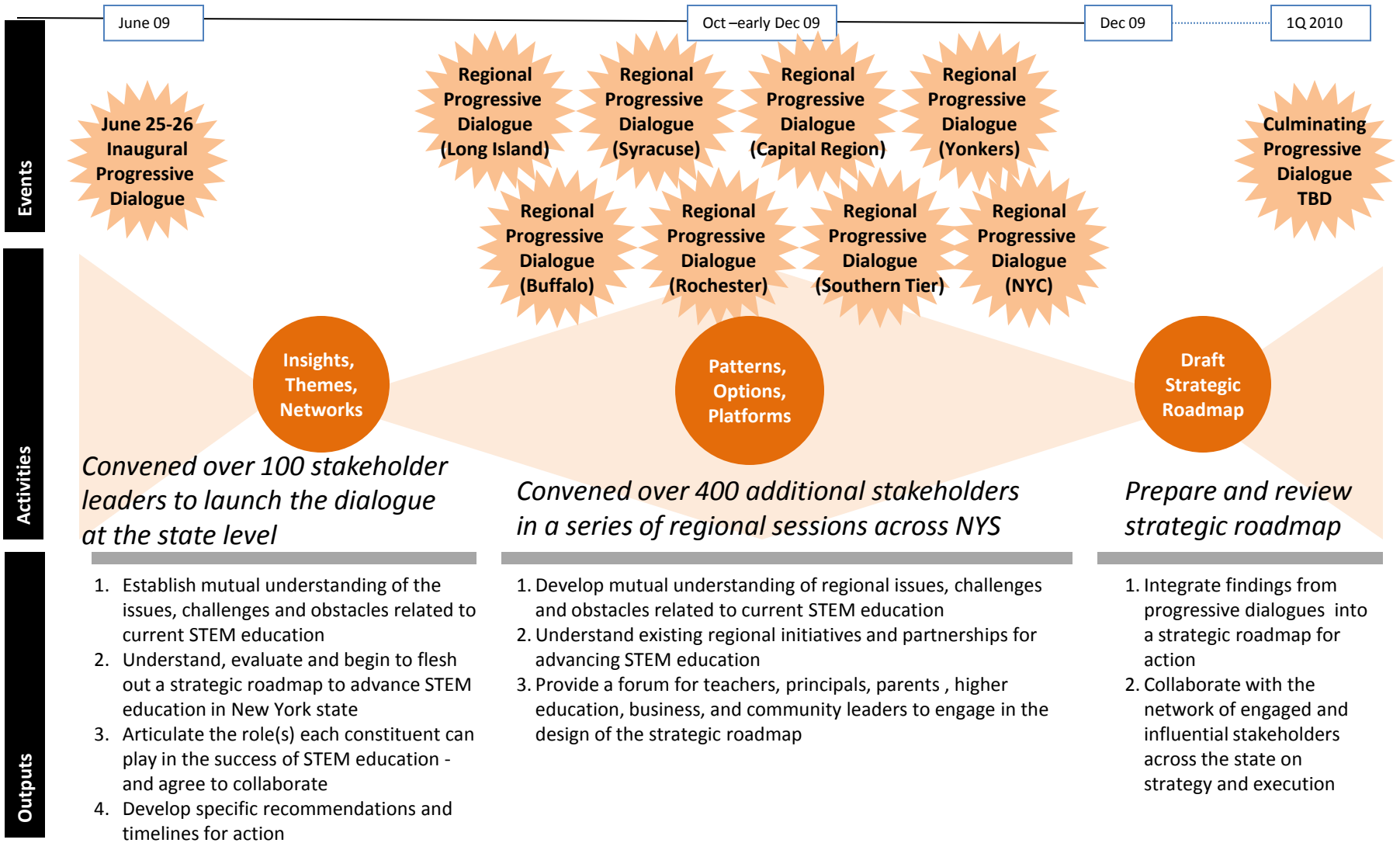


- 71% of the NYS high school class of 2008 graduated – and 29% did not
  - 92% graduated in wealthy districts
  - 73% in rural school systems
  - 50% in large city districts
- 74.4% of NYS 9th graders graduate from high school and go directly to college
  - 57.8% graduate college within 6 years
  - 24.4% graduate community college within 4 years
- Low income and under-represented minority group members comprise a majority of high school graduates but have not kept pace in college enrollment

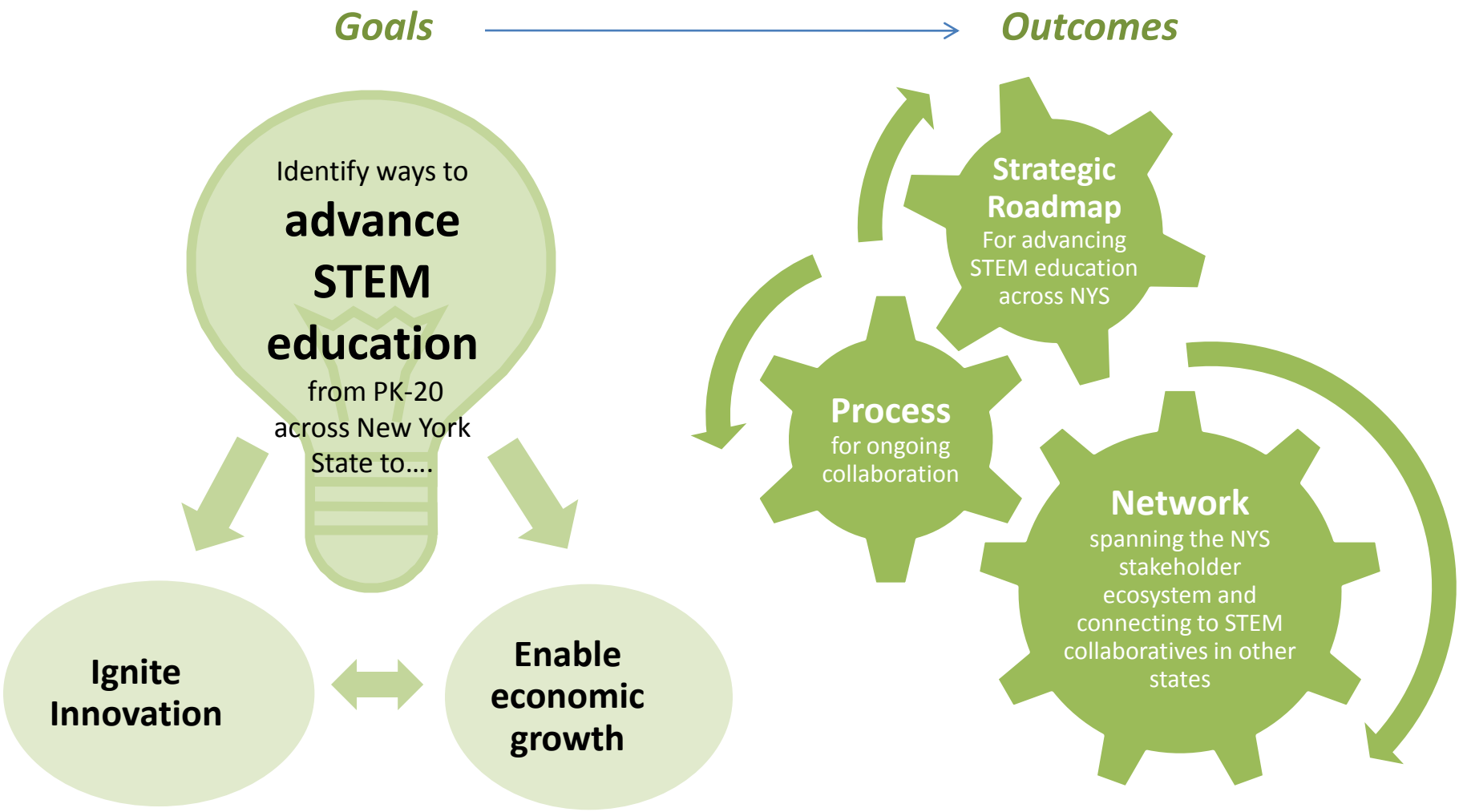
By 2016, the 10 fastest growing occupations in New York State will require STEM competencies

Source: NYS Department of Labor

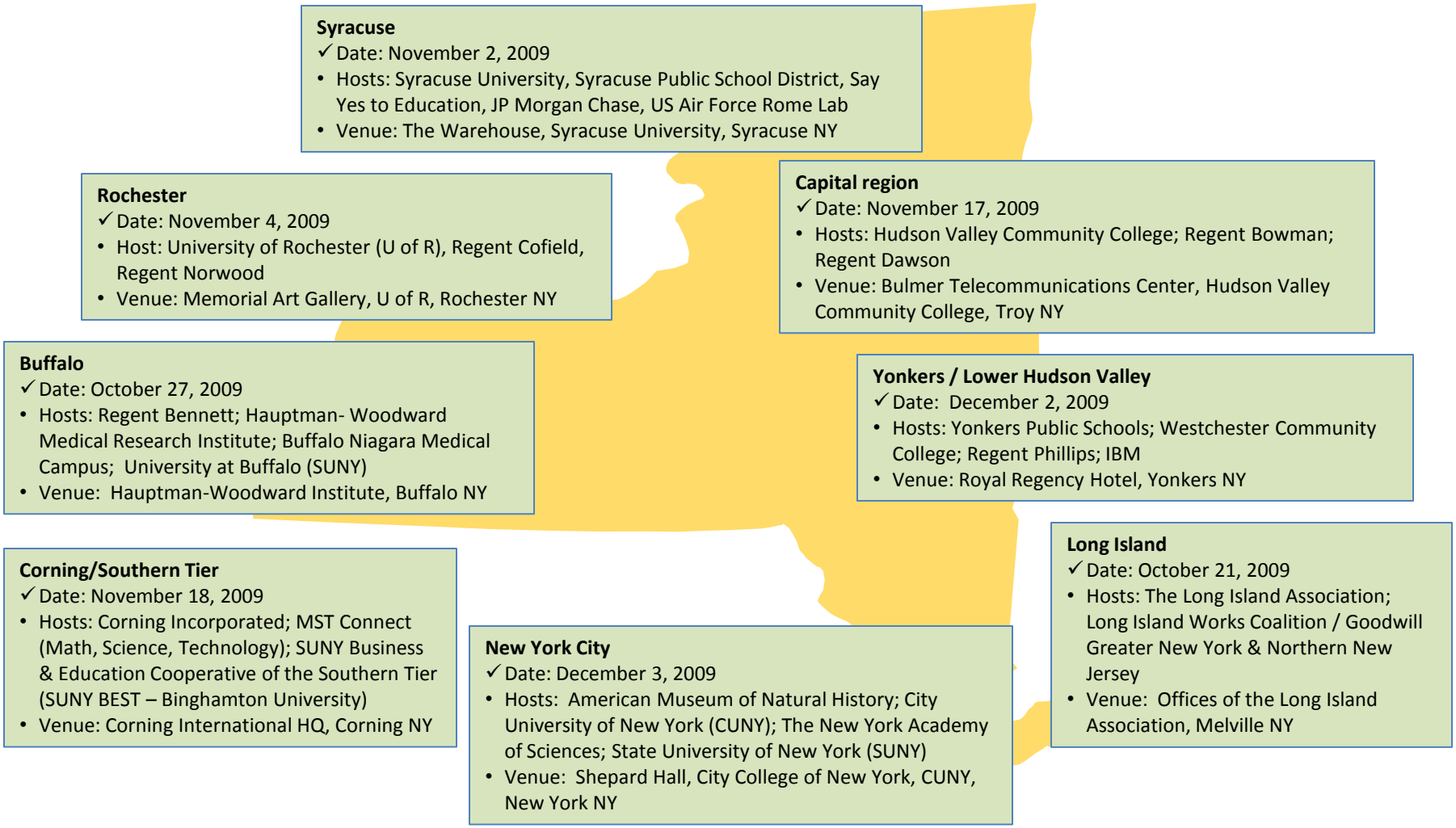
Progressive Dialogue Overview



Progressive Dialogue Goals and Outcomes



Regional Dialogue Hosts



Syracuse
✓ Date: November 2, 2009
- Hosts: Syracuse University, Syracuse Public School District, Say Yes to Education, JP Morgan Chase, US Air Force Rome Lab
- Venue: The Warehouse, Syracuse University, Syracuse NY

Rochester
✓ Date: November 4, 2009
- Host: University of Rochester (U of R), Regent Cofield, Regent Norwood
- Venue: Memorial Art Gallery, U of R, Rochester NY

Capital region
✓ Date: November 17, 2009
- Hosts: Hudson Valley Community College; Regent Bowman; Regent Dawson
- Venue: Bulmer Telecommunications Center, Hudson Valley Community College, Troy NY

Buffalo
✓ Date: October 27, 2009
- Hosts: Regent Bennett; Hauptman- Woodward Medical Research Institute; Buffalo Niagara Medical Campus; University at Buffalo (SUNY)
- Venue: Hauptman-Woodward Institute, Buffalo NY

Yonkers / Lower Hudson Valley
✓ Date: December 2, 2009
- Hosts: Yonkers Public Schools; Westchester Community College; Regent Phillips; IBM
- Venue: Royal Regency Hotel, Yonkers NY

Corning/Southern Tier
✓ Date: November 18, 2009
- Hosts: Corning Incorporated; MST Connect (Math, Science, Technology); SUNY Business & Education Cooperative of the Southern Tier (SUNY BEST – Binghamton University)
- Venue: Corning International HQ, Corning NY

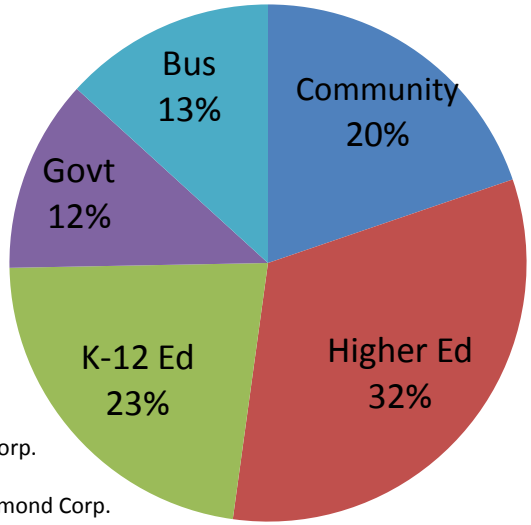
New York City
✓ Date: December 3, 2009
- Hosts: American Museum of Natural History; City University of New York (CUNY); The New York Academy of Sciences; State University of New York (SUNY)
- Venue: Shepard Hall, City College of New York, CUNY, New York NY

Long Island
✓ Date: October 21, 2009
- Hosts: The Long Island Association; Long Island Works Coalition / Goodwill Greater New York & Northern New Jersey
- Venue: Offices of the Long Island Association, Melville NY

Rensselaer gratefully acknowledges the in-kind support provided by the Regional Dialogue hosts

Progressive Dialogue Participant Profile

Over 500 stakeholders



Business/Industry:

- Accenture, LLP
- Anaren, Inc.
- Assured Information Security, Inc.
- AT&T
- Battelle Memorial Institute
- Buffalo Niagara Partnership
- Business Council of New York State, Inc.
- CA, Inc.
- Cameron Manufacturing & Design
- Con Edison
- Corning Inc
- C&S Companies
- eInstruction
- ExxonMobil Corporation
- Fidelity Investments
- Gates Automotive Center
- Global Foundries, Inc.
- Global Imagination
- Hauptman Woodward Medical Research Institute
- IBM
- Infotonics
- JPMorgan Chase & Co.
- King & King Architects, LLP
- Klein Steel
- KPMG LLP
- Krieger Solutions
- Landow and Landow Architects
- Leviton
- Lockheed Martin
- Long Island Association
- Manufacturers' Assoc. of Central New York
- MedTech
- Moog, Inc.
- Motorola
- Niagara Transformer Corporation
- Opus Scientific
- Partnership for New York City
- Portnoy, Messinger, Pearl & Associates
- Raytheon
- Roswell Park Cancer Institute
- Sage Rutty
- Sensis Corp.
- SRC
- The Raymond Corp.
- The Tech Garden
- Time Warner Cable
- Welch Allyn
- Winthrop University Hospital
- World Kitchen LLC

Government:

- The Governor of New York State
- NYS Deputy Secretary for Education
- NYS Senators, NYS Assemblypersons, U.S. Senator's office, Mayors' offices
- NYS Education Commissioner, NYS Regents, and NY State Education Dept. staff
- NYC Chancellor and Dept. of Education
- NYS Dept. of Labor; Industry Development Agencies; Workforce Investment Boards
- NYSTAR; National Labs
- NASA; National Science Foundation; FAA

K-12:

- BOCES (11 districts)
- Charter Schools (5)
- Big 5 Districts + 22 other districts
- Faith-based schools (19)
- NYSUT
- Single Gender School (Emma Willard)
- NYS Teachers' Associations (Math; Science; Technology Education)
- Teacher Centers (5)
- School Boards/Associations

Community participants:

- Foundations: AT&T; Bill & Melinda Gates; Corning Inc.; Ford Motor Company; Srivastava Family; SUNY; Westchester Community College; Woodrow Wilson National Fellowship
- American Museum of Natural History; Buffalo & Erie Public Library; Buffalo Museum of Science; Long Island Science Center; Milton J. Rubenstein Museum of Science & Technology; NYSCI New York Hall of Science; Rensselaer Children's Museum of Science & Technology; Rochester Museum & Science Center; Science & Discovery Center; The New York Academy of Sciences; University of Albany Art Museum; Wings of Eagles Discovery Center
- Public TV: Thirteen/WNET; WCNY, WMHT; WNED; WXXI
- Career Development Council, Inc.; Clean Tech Rocks; Edaccess; Education First; Goodwill Industries of Greater NY & NNJ, Inc.; H2M; Harlem Children's Zone; Hillside Work-Scholarship Connection; Invent Now® Kids; Long Island Works Coalition; Math for America; NACME; On Point for Jobs; Project Lead the Way; Say Yes to Education; Sierra Club; the NYS Society of Professional Engineers, Inc.; U.S. Satellite; United Way of Long Island; Workforce Consortium; World Science Festival
- Parents, PTA members, students
- Ohio STEM Learning Network; Public Strategies LLC; PAST Foundation; TIES (Teaching Institute for Excellence in STEM)

Higher Education:

- City University of New York, City College of New York
- State University of New York: SUNY system; Community Colleges (Corning, Erie, Hudson Valley, Mohawk Valley, Monroe, Onondaga, Schenectady, Suffolk County, Westchester); Universities (Albany, Binghamton, Buffalo, Stony Brook); Colleges (Buffalo State, Empire State, ESF, Farmingdale, Fredonia, Geneseo, Morrisville, Old Westbury, Oswego)
- Private Colleges (Bard, Dowling, Iona, Ithaca, LeMoyne, Nazareth, Roberts Wesleyan, St. John Fisher, the Sage Colleges, Union)
- Private Universities (Adelphi, Colgate, Columbia, Cornell, Fordham, New York Institute of Technology, NYU, Niagara, Rensselaer Polytechnic Institute, Rockefeller, Rochester, Syracuse)

Findings: Constraints and Challenges

Constraints

1. State and federal regulatory boundaries are rigid and constrain local scale educational reform.
2. The STEM education concept is not commonly understood, and the values and benefits associated with STEM education are not well known in education, business and industry nor by the general public.
3. The current system of incentives does not motivate key outcomes (ex., education funding tied to enrollment, not to student performance or teaching quality).
4. There are shortages of STEM-qualified teachers and a lack of professional development in STEM (both pre-service and in-service), needed at the elementary, middle and high school levels. There is no STEM-specific certification at the state level.
5. Current assessments do not measure mastery in project- and problem-based learning, and assessment innovation is limited by the Adequate Yearly Progress indicator.
6. Time segments used in education – school year, school day, and class period – constrain classroom innovations that would be conducive to STEM learning. For example, the class period constrains project-based learning opportunities; seat-time requirements do the same.
7. Use of technology in the classroom is 15-25 years out of sync with the real world, bound by traditional reliance on textbooks and other outdated classroom resources, and by lack of capital investment.
8. The K-20 system is not structured to support STEM; university faculty and administrators are not prepared for or willing to undertake joint program development with K-12 educators.
9. Union contracts have established rules and practices that must be addressed to achieve certain STEM reforms.

Challenges to Transition

- Stakeholders must be engaged across a broad spectrum of interests, expertise and capacities to contribute to the transition to STEM
- Education must be cradle to grave to go beyond K-20
- Effective education must break with current practices that deliver siloed instruction in order to link with real world interests and needs that are meaningful to students who must achieve multiple literacies
- Education must become more entrepreneurial if it is to achieve long-term sustainability

Findings: Headlines for Action

"STEM Education" refers to the interdisciplinary teaching and learning of science, technology, engineering and mathematics, to a level of rigor sufficient to produce critical thinkers and problem solvers across all fields of endeavor.

Build community connections / capacity to address STEM needs through the creation of a statewide STEM Network spanning government, K-12 education, higher education, business, philanthropic and business disciplines.

- **Address STEM teacher needs** across dimensions of human capital management (attract, recruit, develop, retain top talent; performance-based culture; alternative certification pathways)
- **Engage students in STEM** (student-centered design in transformation, project-based learning, alternative learning models)
- **Integrate STEM into the curriculum, standards and assessments** (project-based, experiential, interdisciplinary learning; additional focus and professional development at early grades)
- **Integrate / expand the use of technology throughout the learning environment** (open source models for access to content and expertise, "virtual worlds", distance learning, mobile labs)
- **Pursue new models for schools** (e.g., regional STEM schools, career academies)
- **Integrate education and economic development activities** to eliminate silos / acknowledge links between all disciplines
- **Develop partnerships** involving business, schools, and higher education to ensure education outcomes resonate with local economy and community needs
- **Access available resources** to reshape schools, address teaching deficiencies
- **Create alternative / creative STEM** learning experiences for students
- **Engage state policymakers** and regulators to remove regulatory / legal barriers to change
- **Engage students *and* parents** in STEM learning and transformation

Recommendations are supported by over 2100 data points from plenary and small group discussions

Findings: Empire State STEM Education Network enabler

Proposed network design derived from progressive dialogue: A state-wide system of multi-dimensional, public/private partnerships to manage and execute strategic roadmap

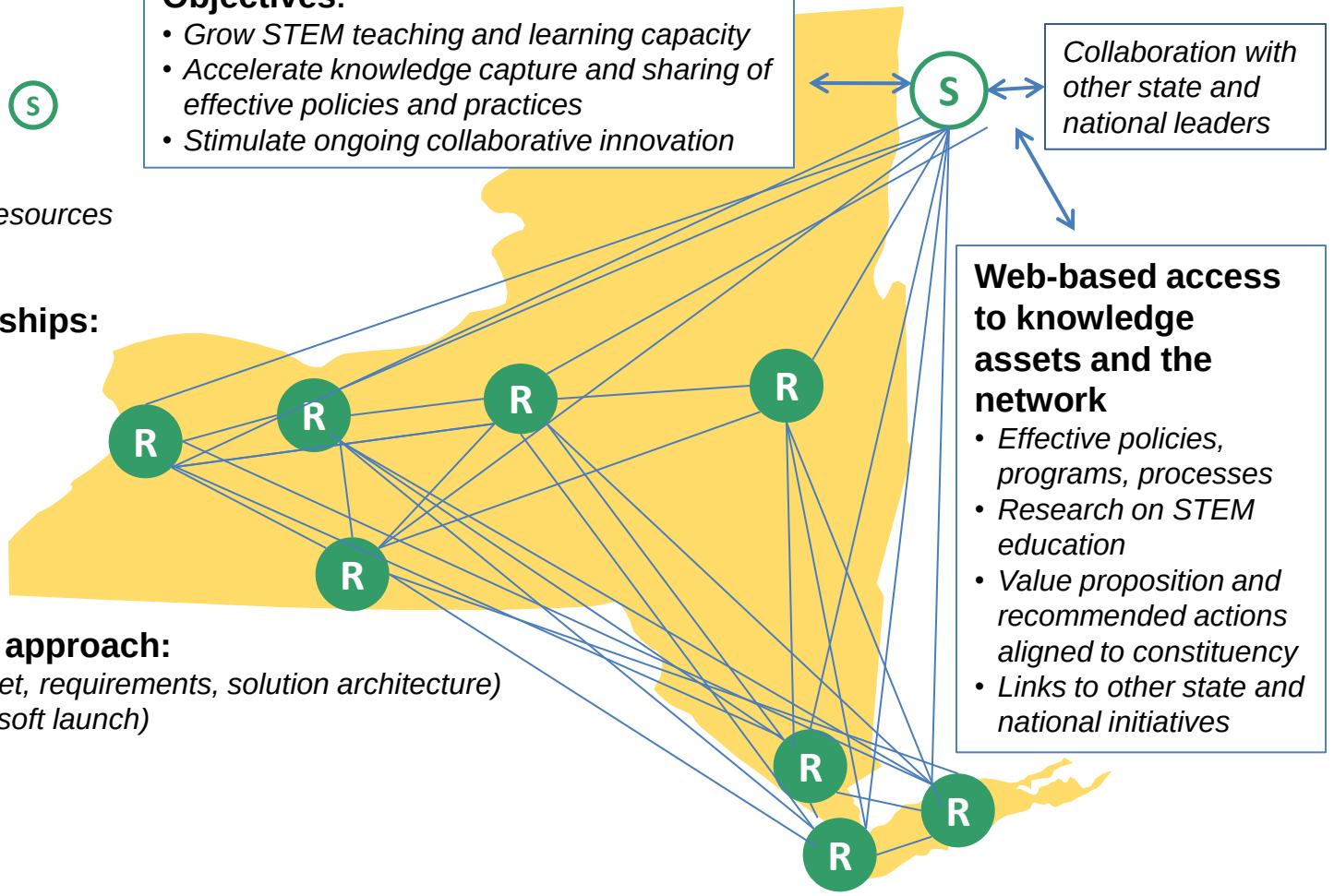
Multi-dimensional:
- *State-wide project office* (S)
- *Regional hubs* (R)
- *Local innovation teams*
- *Connections to national resources*

Public/private partnerships:
- *Business*
- *Education (PK-20)*
- *Parents*
- *NGOs**
- *Government*

Agile systems design approach:
- *Concept (define the market, requirements, solution architecture)*
- *Prototype (develop beta, soft launch)*
- *Adapt (refine)*
- *Implement (scale)*

**Non-government organizations*

Objectives:
- *Grow STEM teaching and learning capacity*
- *Accelerate knowledge capture and sharing of effective policies and practices*
- *Stimulate ongoing collaborative innovation*



Collaboration with other state and national leaders

Web-based access to knowledge assets and the network
- *Effective policies, programs, processes*
- *Research on STEM education*
- *Value proposition and recommended actions aligned to constituency*
- *Links to other state and national initiatives*

Findings: The Value Proposition for Business

Innovation to fuel top-line *and* bottom-line growth in the 21st century knowledge economy

Workforce with the skills and the habits of mind required to succeed in 21st century jobs

Authentic demonstration of **responsibility** to the community, support of inclusiveness in access to education and jobs

Findings: Engagement Opportunities for Business (examples)

Innovation

- Collaborate with faculty, students and incubators on STEM research and development to advance innovation as well as to develop and attract talent
- Explore innovative uses of your products / services in STEM education as incubator and showcase
- Lead the development of a STEM education strategy for communities important to your business, in partnership with educators, workforce boards, and community organizations
- Lead the creation of the STEM education innovation network for New York State as an investing partner in the state-wide and regional hubs

- Advance STEM image and awareness in marketing and recruitment campaigns and collateral

- Advocate STEM-related policy and regulatory changes to remove barriers to innovation at the state and national level

Workforce

- Partner with schools and workforce boards to engage administrators, teachers and students at the K-12 level in innovative, age-appropriate experiential STEM learning opportunities to introduce them to / excite them about your business
- Provide meaningful STEM experiences to interns, co-ops, apprentices; include internships for teachers
- Support employee engagement in STEM outreach (e.g., mentoring; National Lab Day; adjunct appointments; professional associations); consider implementing “transition to” programs to facilitate career moves into teaching for qualified employees
- Support a STEM school at or nearby one of your facilities

Responsibility

Momentum is increasing

www.osln.org

www.ristem.org

www.partnership4learning.org/priorities/initiatives/stem

www.pasteminitiative.org

www.coloradostemeducation.com

Beginning to develop state networks

Race to the Top
American Graduation Initiative
"Educate to Innovate" Campaign
www.ed.gov/programs/**racetothetop**/
www.whitehouse.gov/issues/education/educate-innovate

www.tstem.org

www.ncstem.org

Actions underway - National

1. Race to the Top
   - STEM Resource Conference held December 11, 2009 in Baltimore
   - New York was one of 41 states that submitted Phase 1 applications on January 19, 2010
   - ***** New York announced as one of 15 finalists on March 4, 2010 *****
   - Winners for Phase 1 to be announced in April with feedback to those who do not win
   - Phase 2 will provide another opportunity to apply (June – September)

   http://www.ed.gov/programs/racetothetop/index.html

2. Educate to Innovate
   - White House announced public-private partnerships on November 23, 2009

     http://www.whitehouse.gov/issues/education/educate-innovate
   - One Million Minds Campaign

     http://connectamillionminds.com/
   - National Lab Day

     http://www.nationallabday.org/

3. Engineering Education for Innovation Act ("E2 for Innovation Act") introduced in the Senate February 25, 2010
   - Significant STEM content – download here

4. Investing in Innovation Fund ("i3 grants")

   http://www.ed.gov/programs/innovation/factsheet.html

Actions underway – New York State

1. New York State's Race to the Top application
   http://usny.nysed.gov/rttt/

2. Regents' STEM-related policy update
   http://www.regents.nysed.gov/meetings/2010Meetings/January2010/0110monthmat.html
   (Refer to "Proposed Regents 2010 State and Federal legislative Priorities" item)
   http://www.regents.nysed.gov/meetings/2010Meetings/February2010/0210monthmat.html
   (Refer to Statewide Learning Technology Plan item)

3. Governor's Task Force on Industry-Higher Education Partnerships final report
   http://www.ny.gov/governor/reports/pdf/IHETF_Report_FINAL.pdf

Actions Underway – Community partnership examples

NYS professional associations' STEM education collaborative:

- NYSTEA (NYS Technology Education Association)
- AMTNYS (Association of Math Teachers of NYS)
- STANYS (Science Teachers Association of NYS)
- ASEE (American Society of Engineering Education)
- NYSSPE (NYS Society of Professional Engineers, Inc.)

STEM Institute planned for August 2010 in Oswego

Rochester Area Colleges Center for Excellence in Math and Science: Collaboration among 19 post-secondary institutions in the region with schools and businesses to increase the quality and quantity of the student STEM talent pool

Say Yes Syracuse: Collaboration among the Syracuse City School District, Syracuse University, and the Say Yes to Education Foundation to increase high school and college graduation rates

SUNY STEM Conference: Connection of STEM pipeline program leaders across the SUNY system

Tech Valley High School: Collaboration among K-12 public schools, higher education, business, organized labor and government in the Capital region

The Buffalo Niagara Medical Campus: public/private partnership to promote knowledge-based transformation of Western New York – clinical care, research, education, entrepreneurship - in the biomedical field

MST Connect (Math, Science, Technology): Network of business, education, and community leaders hosted by Corning Inc. which is designing a STEM strategy for the Greater Southern Tier region

Summer Enrichment Program: STEM partnership between Yonkers Public Schools and universities to engage middle school students in STEM learning experiences on college campuses

Career Academies on Long Island: Partnership between the Ford Motor Company Fund, Long Island Works Coalition, and participating school districts to link economic and workforce development with education

Columbia Summer Research Program for Science Teachers: University/K-12 collaboration to provide hands-on scientific research experience to teachers, proven to improve outcomes for participating teachers' students

NYSCI Science Career Ladder: New York Hall of Science education and employment program to attract and develop future science teachers in collaboration with CCNY and CUNY Graduate Center

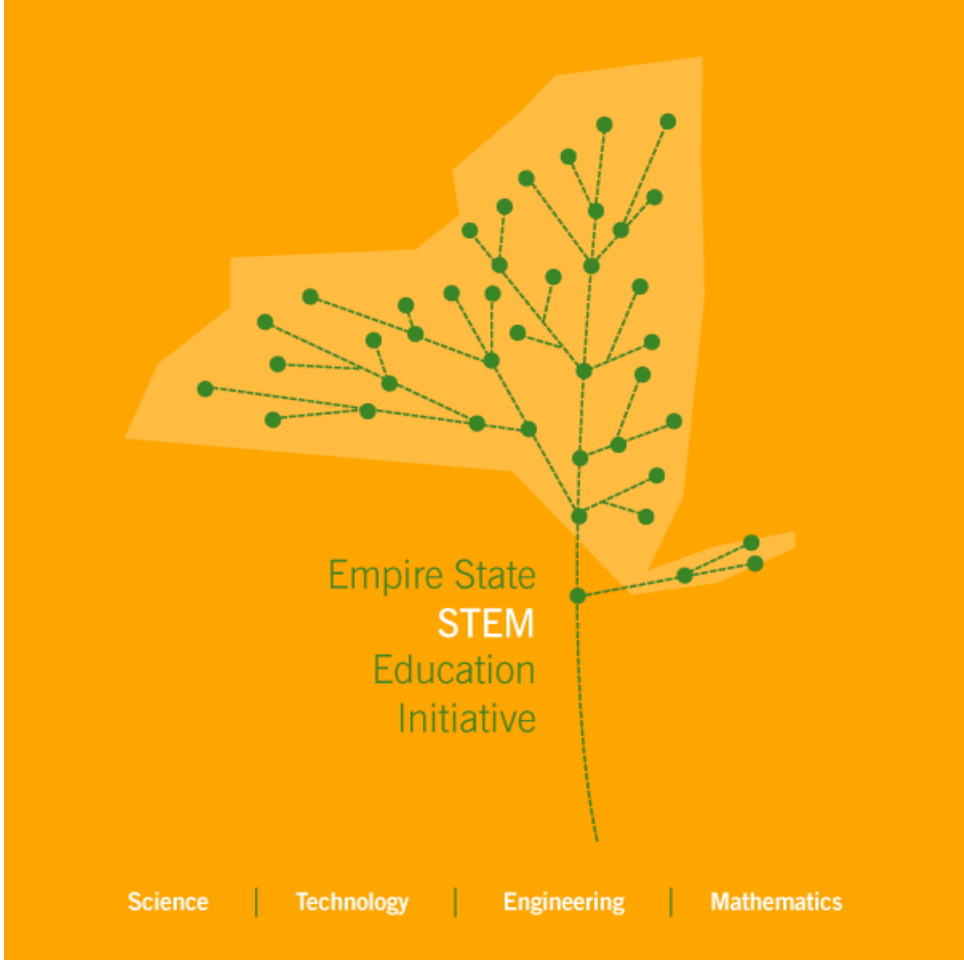
Next Steps

- Complete the draft roadmap
- Secure partners in moving from dialogue to action
- Convene a culminating dialogue to launch roadmap execution

Who will be the future

- **inventors and innovators?**
- **educators?**
- **citizens prepared for work and life?**

What will YOU do to prepare them?



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