

PIPE-STEM

Program Improvement Process for
Equity in Science, Technology,
Engineering, and Math™



What Is PIPE-STEM?

The *Program Improvement Process for Equity in STEM™* (PIPE-STEM™) is a research-based, effective professional development program designed for school teams to increase the participation and success of female students—particularly girls and women of color—in science, technology, engineering, and mathematics (STEM). PIPE-STEM training includes five modules:



Module 1: ORGANIZE. How to organize a pipeline team. NAPE will provide all the tools necessary to coordinate project orientation, collect pilot site baseline data, and prepare the school teams for training.

Module 2: EXPLORE. How to analyze national, state, and school gendered performance and participation in STEM by comparing performance levels among

schools, student populations, and programs over time. School teams will use summary statistics and basic graphs and charts to document performance gaps, based on gender, race/ethnicity, and other available disaggregated data, and to identify improvement priorities.

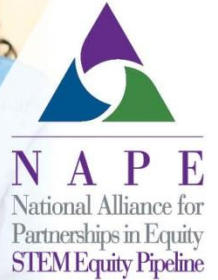
Module 3: DISCOVER. How to determine the most important and most direct causes of gendered performance gaps that can be addressed by improvement strategies and specific solutions. School teams will use multiple methods to identify and evaluate potential causes and select a few critical root causes as the focus of improvement efforts. The cornerstone resource for this and the next step is a distillation of the past 20 years of research literature on nontraditional career preparation, especially on women's access to STEM careers.

Module 4: SELECT. How to use the results from the DISCOVER process to align team-identified root causes with potential solutions to gendered performance gaps, including both improvement strategies and program models. Teams will review and evaluate the underlying logic of these solutions and the empirical evidence of their effectiveness in achieving performance results.

Module 5: ACT. How to explore practical and rigorous methods and tools for evaluating solutions before full implementation and then develop plans to implement research-based interventions for program improvement.

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What Can a State Team Member Expect During a School Year?

Team members will work together to analyze the school's data, review the research, develop hypotheses regarding gendered participation or performance, and implement and test research-based interventions. They will share lessons learned (i.e., conducting workshops at state or regional sponsored professional development, writing articles for state newsletters and publications, conducting online training with others, and working one-on-one with other college and high school teams interested in implementing the process to improve their performance).

Team members will actively participate in 3 full days of professional development and necessary intersession teamwork:

- Virtual project orientation (1 hour/member)
- First face-to-face training (Modules 1-3) (1 day/member)
- Monthly technical assistance calls with NAPE trainer; collect quantitative and qualitative data aligned with root causes hypotheses; prepare for presentation at the second face-to-face training (8 hours/member)
- Second face-to-face training (Modules 4-5) (1 day/member)
- Monthly technical assistance calls with NAPE trainer; implement and evaluate research-based

solutions to increase female participation in STEM; prepare for presentation at the third face-to-face training (16 hours/member)

- Third face-to-face training (school teams share results) (1 day/member)

What Is NAPE?

NAPE is a consortium of state and local agencies, corporations, and national organizations committed to access, equity, and diversity in education and careers. The NAPE Education Foundation was established in 2002 in response to requests for expanded assistance with program improvement efforts by education and workforce agencies across the nation.

The NAPE Education Foundation initially developed PIPE-STEM training through a grant funded by the National Science Foundation. During its first 3 years, the project reached more than 20,000 educators who served more than 3 million high school and community college students. More than 70 secondary schools and community colleges have participated in school team activities through PIPE-STEM.

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In interviews conducted by the project's independent evaluators, team members identified the following five significant benefits:

- better understanding and use of data;
- increased awareness of and commitment to STEM equity issues;
- new partnerships created;
- increased female participation and retention in STEM-related programs of study; and
- improved project sustainability and expansion.

Pilot site participants have reported an increase in female participation rates as a result of implementing their selected strategy as part of PIPE-STEM. Examples include an increase from 8 to 30 females in Project Lead the Way; an increase from 0 to 3 females in a design technology class; an increase from 3 to 20 females in a STEM summer camp; and increase from 7 to 21 females in auto technology; an increase from 12 to 21 females in electronics and telecommunications; and an increase from 15% to 22% in senior girls in advanced math in 2 years.



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Learn more at napequity.org/pipestem

National Alliance for Partnerships in Equity

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