False Start

A Missed Opportunity for Women and Girls in Science, Technology, Engineering, and Mathematics in the

Race to the Top Awards

National Alliance for Partnerships in Equity

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Executive Summary

The National Alliance for Partnerships in Equity (NAPE) is a national, nonprofit consortium that collaborates to create equitable and diverse classrooms and workplaces. Through its Education Foundation, NAPE has been involved in the STEM Equity Pipeline Project, which works with educational systems to implement research-based approaches to increase the participation of underrepresented populations in science, technology, engineering, and math (STEM) education.

In 2010, NAPE joined forces with the National Girls Collaborative Project (NGCP) and Multinational Development of Women in Technology (MDWIT) to develop recommendations related to the third priority of the Educate to Innovate campaign, that is, to "expand STEM education and career opportunities for underrepresented groups, including women and girls." A similar priority was also integrated into the U.S. Department of Education's Race to the Top (RTTT) competitive grant program. Specifically, in its application for RTTT funds, a state was expected to demonstrate high-quality plans to (i) offer a rigorous course of study in STEM; (ii) cooperate with community partners to assist teachers in various initiatives; *and* (iii) prepare more students for advanced study and careers in STEM, including underrepresented groups and women and girls. As part of its work with NGCP and MDWIT, NAPE agreed to research the quality of the states' responses to criterion iii and the reviewers' scoring of the overall priority.

NAPE reached the overall conclusion that criterion iii was misunderstood. Applications ranged from not addressing the criterion to describing programs that are showing impressive results. Reviewers also differed in their interpretation of the degree to which an applicant needed to prove its capacity to increase the access and success of underrepresented students in STEM. It appears as though the instructions and training provided to reviewers for scoring the Priority were not sufficient to result in a consistent scoring response. Therefore, the individual reviewer's opinions about the adequacy, or even the necessity, of addressing criterion iii may have affected the scoring outcome. In addition, NAPE was disappointed that the review revealed inadequate responses to criterion iii and the general use of programs serving all students as meeting the needs of underrepresented students, a notion not supported by research.

In undertaking this project, NAPE's goal was to assist the Department of Education in its review of its competitive grants programs. To this end, NAPE presents the following recommendations for the Department's consideration:

1. Provide clear instructions for reviewers about how to score applications, especially when scoring criteria for which there is no commonly held standard or when there is an opportunity for reviewer bias, explicit or implicit, to influence the review.
2. If a priority involves multiple criteria but "all or nothing" scoring, then remind reviewers that the applicant must satisfy all criteria to earn points and require written evidence that the reviewer considered all criteria.
3. Use current research to clearly articulate the types of programs that reviewers should be looking for when reviewing programs designed for underrepresented groups.
4. Select reviewers with expertise in research and program development that have successfully increased the access and success of underrepresented groups in STEM.
5. Have specialists review and score priority sections of an application.
6. Continue to include in all future funding opportunities a priority for increasing the access and success of underrepresented groups, specifically women and girls, in STEM education and careers.

Introduction

The National Alliance for Partnerships in Equity (NAPE) is a national, nonprofit consortium of state and local agencies, corporations, and national organizations that collaborate to create equitable and diverse classrooms and workplaces where there are no barriers to opportunities. NAPE's fundamental purpose has been to provide leadership, technical assistance, and professional development about equity issues in education related to workforce development, including career and technical education.

In 2002, NAPE established the National Alliance for Partnerships in Equity Education Foundation, Inc. The Foundation collaborates with education agencies, teachers, parents, and employers to develop equitable, innovative, and effective programs and practices to increase diversity in America's workforce and to increase opportunities in high-skill, high-wage, high-demand careers. The Foundation has been involved primarily in the National Science Foundation-funded STEM Equity Pipeline Project, which works with educational systems to implement research-based approaches to increase the participation of underrepresented populations in science, technology, engineering, and math (STEM) education.[1]

When President Obama announced the Educate to Innovate campaign in early 2009 to improve STEM education in the United States, NAPE was particularly pleased that the Administration chose to ***"expand STEM education and career opportunities for underrepresented groups, including women and girls"*** as one of its three priorities. Interest in this priority led NAPE to join forces with the National Girls Collaborative Project and Multinational Development of Women in Technology to create a set of recommendations regarding the priority. The collaboration[2] conducted an electronic brainstorming process with more than 800 organizations, held a listening session with federal agency representatives at the White House Conference Center in July of 2010, and created a report. During the listening session, the following question was posed: What had the Department of Education (DoED) seen in its first round of Race to the Top (RTTT) applications regarding the quality of the responses to the similar priority in the RTTT call for proposals? Because the attendees were unaware of the answer, and recognizing that the applications and reviews are readily available on the Internet, NAPE agreed to research the question regarding the RTTT applications.

Alabama
Alabama describes the statewide Alabama's Girls Engaged in Math and Science University (GEMS-U) project, which works to provide nontraditional academic and career opportunities to female students and support them in the pursuit of STEM-related learning opportunities and careers.

Delaware
Delaware's STEM strategy has five parts, including MIT BLOSSOMS, which is offered through the Massachusetts Institute of Technology to help teachers integrate STEM content across grades and disciplines and encourages underrepresented groups and women to pursue careers in math and science.

Florida
Florida describes the FCR-STEM Female-Minority Initiative, which brought together a group of education and workforce development experts to examine policies, programs, and strategies that hold promise for increasing the state's female and minority representation in STEM courses and fields. The Initiative's final report suggests strategies to implement 21 specific recommendations with the goal of increasing student interest and awareness, improving STEM instruction, building school capacity to improve STEM education, and make informed policy decisions.

In late 2010, DoED announced its intent to review the competitive grants programs to determine how to improve and standardize the scoring process; how to train and retain reviewers; how to create an overall design for the competition; how to set specific scoring criteria; and, to the greatest extent possible, how to make sure the public and applicants understand the guidelines and requirements, particularly as they affect meeting the needs of underrepresented groups and women and girls.[3] Our goal for this analysis is to assist DoED in this regard and hope that the recommendations found in this report can help improve the review process. As new programs are developed and old ones revised, we encourage DoED to continue to give priority to

[1] For more information about NAPE and the STEM Equity Pipeline Project, see www.napequity.org and www.stemequitypipeline.org, respectively.
[2] For more information about the collaboration, see www.stemcollaboration.org.
[3] Cavanagh, S. 2010 (November 23). Ed Department to review its competitive grant programs. Education Week. Available at http://blogs.edweek.org/edweek/state_edwatch/2010/11/ed_department_conducts_review_of_competitive_grant_programs.html.

innovation that leads to increasing the participation of underrepresented groups, especially women and girls, in STEM education and careers.

Race to the Top Background

The American Recovery and Reinvestment Act (ARRA) provided $4.35 billion for the Race to the Top (RTTT) Fund, a competitive grant program designed to encourage and reward states that are creating the conditions for education innovation and reform; achieving significant improvement in student outcomes; and implementing ambitious plans in four core education reform areas (DoED, 2009).

States that demonstrated success in raising student achievement and had the best plans to accelerate their reforms were awarded RTTT grants and will serve as models for others to follow. DoED awarded grants in two phases: Phase 1 awards to Delaware and Tennessee (2 out of 16 finalists) were announced in April 2010, and Phase 2 awards to the District of Columbia, Florida, Georgia, Hawaii, Maryland, Massachusetts, New York, North Carolina, Ohio, and Rhode Island (10 out of 19 finalists) were announced in August 2010 (DoED, 2010a,b,c,d).

DoED based its awards on states' abilities to meet six criteria: state success factors, standards and assessments, data systems to support instruction, great teachers and leaders, turning around the lowest-achieving schools, and general selection criteria. Absolute priority (Priority 1) was given to states that have a comprehensive approach to education reform. Competitive preference priority (Priority 2) was given to states who emphasize STEM in their plans. Priorities 3 through 4 were invitational and related to early learning outcomes, data systems, P-20 coordination and alignment, and school conditions, respectively. It is the states' information about their activities related to Priority 2 that was of particular interest to NAPE and is the focus of this report.

Hawaii
Hawaii's Women in Technology project encourages girls, women, and other underrepresented groups to pursue STEM careers and involves local business partners who provide technology resources and support for participating schools.

Iowa and Missouri
Iowa and Missouri included their participation in the NAPE Education Foundation's National Science Foundation-funded STEM Equity Pipeline Project, focused on integrating research-based strategies for increasing gender equity in STEM programs of study into professional development with secondary and community college faculty.

Louisiana
Louisiana describes its involvement in the following programs focused on underrepresented groups: Southern University's summer science camps, Science Adventures Summer Camps, LSU's Xcite program, and Sally Ride Science Festivals.

Priority 2: Competitive Preference Priority — Emphasis on STEM

Competitive Preference Priority 2 is worth 15 points, or 3 percent of the total possible points. It is the only "all or nothing" criterion in the application; that is, applicants are eligible for either 0 or 15 points. The total awarded to the applicant is not based on an average of individual reviewer scores in this section. Rather, 15 points are added to the applicant's Average Total Score if a majority of reviewers determined that the applicant has met all of the criteria (indicated by the individual reviewer entering 15 points in that field).[4]

Specifically, the state must have a high-quality plan to address the need to

i. offer a rigorous course of study in mathematics, the sciences, technology, and engineering;

ii. cooperate with industry experts, museums, universities, research centers, or other STEM-capable community partners to prepare and assist teachers in integrating STEM content across grades and disciplines, in promoting effective and relevant instruction, and in offering applied learning opportunities for students; **and** [emphasis added]

[4] From footnote * in Panel Review by Applicant forms (Score Sheets), available at http://www2.ed.gov/programs/racetothetop/phase1-applications/index.html.

iii. prepare more students for advanced study and careers in STEM, including by addressing the needs of underrepresented groups **and** of women and girls in the areas of STEM. [emphasis added] (DoED, 2009)

We emphasize the "and" after item ii and in item iii because its use signifies that all items (or criteria) must be met to satisfy the requirements of the priority. Indeed, slide 195 of an Initial Training document states, "To meet this priority, the State's application must have a high-quality plan that addresses all three aspects of the STEM priority."[5]

In its review of the applications, NAPE focused on the applicants' responses to criterion iii and whether or not applicants specifically identified programs that target women and girls' access to and success in STEM education. It is well known that programs that use fundamentals to target students from underrepresented groups work for all students. However, the opposite, that is, that programs designed for the majority of students also work for underrepresented groups, does not necessarily hold true. In the best of worlds, efforts to lift all ships will be informed by a deeper understanding of what it takes to succeed at the level of the targeted program, while effective targeted programs will be more tightly integrated into the system (BEST, 2004). [6] With this in mind, the RTTT applications were reviewed for programs that explicitly target underrepresented groups, including women and girls.

Samples of state responses to criterion iii that identified programs specifically addressing the needs of underrepresented populations in STEM can be found throughout this report.

Michigan
Michigan's Mathematics and Science Centers Network and Career and Technical Education provide hands-on activities and competitions designed to attract underrepresented groups into STEM career paths, including First Robotics, the Real World Design Challenge, You Be the Chemist, the Girls Math Science Conference, a mentoring program with the Girl Scouts, and weekly sessions with rural students.

Nevada
Nevada will expand initiatives such as the University of Nevada's Girl's Math Camp, the Mathematics, Engineering, Science and Achievement Program, summer engineering camps, and the UNLV's Upward Bound Program to enable greater access for underrepresented groups to enter and be successful in STEM education and careers.

North Carolina
North Carolina describes its involvement with the NC State Women in Engineering Outreach Program, which encourages young girls and women to consider careers in the STEM disciplines.

Analysis of Applications

Methodology

Because of resource constraints, it was not possible to review each application in its entirety. However, an applicant was expected to address Priority 2 throughout the application, as appropriate, and to provide a summary of its approach to addressing the priority in the Priority Section of the application.[7] Consequently, we employed the following approach to review the applications from each phase:[8]

1. We read the information provided in the Priority 2 section of the application and noted specific references to plans to address the needs of underrepresented groups and women and girls. If criterion iii was not summarized there, we assumed that it was not mentioned in the main body of the application.

[5] Available at http://www2.ed.gov/programs/racetothetop/phase1-resources.html.
[6] BEST convened "the nation's respected practitioners, researchers and policymakers [to] identify 'what's working' across the country to develop the technical talent of under-represented groups in pre-K through 12, higher education, and the workplace." For more information, visit http://www.bestworkforce.org/index.htm.
[7] Slide 196 of Initial Training document, dated January 23, 2010, available at http://www2.ed.gov/programs/racetothetop/phase1-resources.html.
[8] The states' application, reviewer comments, and score sheets are available at http://www2.ed.gov/programs/racetothetop/phase1-applications/index.html.

2. We reviewed the reviewers' comments for specific references to the state's plans to address the needs of underrepresented groups and women and girls.[9] We noted the individual reviewers' scores and the state's Average Total Score for the priority.

Findings

In this section, we summarize our overall findings from our reviews of the 41 Phase 1 and 36 Phase 2 applications and provide quotes from reviewers to highlight concerns about the review process. Summaries by state are provided in Appendixes A and B. Please note that we did not make a determination about the strength or potential impact of a state's plans to address the needs of underrepresented groups and women and girls.[10]

Phase 1: We determined the following information about the 41 states that submitted Phase 1 applications:

- Of the 41 states, 40 states[11] summarized their approach to satisfying Priority 2 in the Priority section of the application. However, 11 states (27%) did not explain in their summaries how their approach will meet the needs of underrepresented groups. *Of the 11, 5 were awarded 15 points for Priority 2* (Colorado, Kentucky, New Jersey, Rhode Island, and South Carolina). *Of the 5, 2 received comments that their STEM plans do not adequately address the needs of underrepresented groups* (Colorado and Rhode Island), for example:
  - The state "should give more attention to isolating the problems associated with STEM criteria iii."
  - "[W]hile there was enough there to award the points, there are some important missing elements including…little to no attention to reaching out to underrepresented students and girls."
  - "On the negative, there is no clear sense of a plan that would, for example, address the needs of underrepresented groups and of women and girls in STEM fields."
  - "However, the application has overlooked efforts to improve the representation of underrepresented groups—including women and girls in STEM programs."
- Fifteen states (37%) specifically mentioned initiatives to address the needs of women and girls (see Box 1).
- Of the 205 reviews (41 applications x 5 reviews/application), only 72 reviewers (35%) included in their comments that the state's STEM plans do/do not address the needs of underrepresented groups.

Pennsylvania
Pennsylvania's STEM initiative regional centers support numerous local programs specifically targeted to increasing participation of underrepresented groups in STEM, including participation in the National Girls Collaborative Project at Carnegie Mellon Science Center, which recently was awarded $200,000 to expand its innovative urban science adventure program designed specifically for middle school girls.

Rhode Island
Rhode Island explains that it has a strong history of collaboration with its universities, industry partners, and informal education centers regarding innovative STEM initiatives. Several of these programs, such as Girls Reaching Remarkable Levels TECH and Brown's Women in Science and Engineering, specifically target middle-school and high-school girls.

Utah
Utah has instituted the MESA (Mathematics, Engineering, and Science Achievement) program to increase the number of underserved, ethnic, minority, and female students who pursue coursework, advanced study, and careers in STEM.

- Seventy-six reviewers (37%) assigned a state 15 points for Priority 2 but did not comment on its plans to address the needs of underrepresented groups.

[9] Each application was reviewed by five reviewers. We acknowledge the possibility that a reviewer might not have commented on the state's satisfaction of criterion iii if he/she had already determined that the state had not satisfied criteria i or ii.
[10] To avoid repetitive wording, we will use the term "underrepresented groups" as inclusive of women and girls, low-income students, African American, Hispanic, and Native American students, and students with disabilities unless otherwise specified.
[11] The application posted for West Virginia was incomplete.

- Thirteen reviewers (6%) assigned a state 15 points for Priority 2 despite noting that the state's STEM plans do not address the needs of underrepresented groups. The following are examples of such reviewer comments:
  - "The state did not directly address the needs of women and girls in the STEM part of the proposal, but again, the results on NAEP and other measures indicates [sic] the state is headed in the right direction."
  - "There were lesser amounts of attention given to building career tracks, especially for women and minorities. Because reviewers are required to give all or no points, this proposal will be given 15 points."
  - "While the applicant as a whole has met the competitive priority, the Applicant could expand upon strategies to address under-represented groups such as minorities and women for greater inclusion in STEM programs."
  - "It should be noted that the application does not address the needs of underrepresented groups and women and girls."
- Eight reviewers (4%) assigned a state 15 points for Priority 2 and commented that the state's plans to engage "all" students in advanced studies and careers in STEM satisfy criterion iii. The following are examples of such reviewer comments:
  - "Because several of the teacher preparation programs are focused on placing the teachers in areas where the taking of advanced courses and the attending of college is not common, the placing of these teachers will also touch underrepresented students and women with the message that they can succeed at both—hard courses and college."
  - "The state makes a very clear effort to prioritize STEM efforts in all its proposed activities… by doing so in all participating LEAs, it will address opportunities for underrepresented groups in STEM opportunities."
  - "The proposal could have given more attention to programs that encourage underrepresented populations. However, plans to expand the current number of Governor's Career and Technical Stem Academies will likely help this concern. Because the reviewers are required to give all or none points to this section, the proposal will be given 15 points."
  - "The state is making efforts to prepare more students for advanced study and careers in the STEM fields. Properly and thoroughly implemented, these initiatives are likely to reach underrepresented groups with its efforts."

Phase 2: We determined the following about the 36 states that submitted Phase 2 applications:

- Of the 36 states, 33 states[12] summarized their approach to satisfying Priority 2 in the Priority section of the application. However, 11 states (31%) did not explain in their summaries how their approach will meet the needs of underrepresented groups. *Of these, six were awarded 15 points for Priority 2* (Arkansas, California, Colorado, Kentucky, New Jersey, and South Carolina). *Of these six, three received comments that their STEM plans do not adequately address the needs of underrepresented groups* (Arkansas, New Jersey, and South Carolina), for example:
  - "There is one sentence suggesting that these programs will be offered to young women as well as men. There is another sentence mentioning racial and ethnic group access to STEM programs. This minimal commitment is by no means fleshed out in detail."

[12] New Hampshire, Maine, and Iowa did not provide a narrative in the Priority 2 section of the application.

- "There is minimal discussion of career opportunities for girls, women, and minorities except for several city programs…"
- "Expanding 'outreach programs to minorities and female students' is not the same as addressing the needs of underrepresented groups and of women and girls in STEM."

- Seventeen states (47%) specifically mentioned initiatives to address the needs of women and girls (see Box 1).

Box 1: States That Addressed How Their STEM Plans Meet the Needs of Women and Girls

Alabama (Phase 1 and 2)
Arizona (Phase 2)
Connecticut (Phase 2)
Delaware (Phase 1)
District of Columbia (Phase 1 and 2)
Florida (Phase 1 and 2)
Hawaii (Phase 2)
Idaho (Phase 1)
Illinois (Phase 1 and 2)
Iowa (Phase 1)
Louisiana (Phase 1 and 2)
Michigan (Phase 2)
Nebraska (Phase 1 and 2)
Nevada (Phase 2)
New Mexico (Phase 1 and 2)
New York (Phase 2)
North Carolina (Phase 1 and 2)
Oklahoma (Phase 1)
Pennsylvania (Phase 1 and 2)
Rhode Island (Phase 2)
Utah (Phase 1 and 2)
Wyoming (Phase 1)

Samples of state responses to criterion iii that identified programs specifically addressing the needs of underrepresented populations in STEM can be found throughout this report.

- Of the 180 reviews (36 applications x 5 reviews/application), 120 reviewers (67%) included in their comments that the state's STEM plans do/do not address the needs of underrepresented groups, which signals an increased awareness from Phase 1.
- Thirty-six reviewers (20%) assigned a state 15 points for Priority 2 but did not comment on its plans to address the needs of underrepresented groups.
- Nine reviewers (5%) assigned a state 15 points for Priority 2 despite noting that the state's STEM plans do not address the needs of underrepresented groups. The following are examples of such reviewer comments:
  - "The plan makes passing reference to women and science but overall there is an emphasis on STEM in [the state's] plans."
  - The state's "major shortfall with its proposed STEM programs is that there is no specific mention that they are designed to target underrepresented groups. The hope and assumption is that [the state's] robust plan for advancing STEM with students will directly benefit women and girls, and other underrepresented groups. The strength of the plan outweighs this oversight of a key element of the criterion."
  - The plan does not "mention targeting specific subgroups of students traditionally unexposed or denied access to STEM courses."
  - "The application addresses the need to focus on underrepresented groups but does not specifically address the issue of women and girls in any meaningful fashion."

- Five reviewers (3%) assigned a state 15 points for Priority 2 and commented that the state's plans to engage "all" students in advanced studies and careers in STEM satisfies criterion iii. The following are examples of such reviewer comments:
  - The Environmental and Space Initiative "is for everyone and … reflects the diversity of every school" and "will work particularly well with underrepresented groups."
  - The state's "frequent use of 'all students' to include women and minority populations is accepted with some concern."
  - The state's "plans to provide STEM internships, co-ops, or lab experiences for all interested high school and college students to jump-start their successful transition to the workplace" satisfy criterion iii.
  - "Expansion is planned across the state to include all students, which will include historically underrepresented groups in STEM such as women and girls."

Also noteworthy, Connecticut did not address criterion iii in its Phase 1 application but did so in its Phase 2 application; however, its score for Priority 2 remained unchanged at zero points. In contrast, Arkansas addressed criterion iii in its Phase 1 application but did not do so in its Phase 2 applications, but its score for Priority 2 went from 0 to 15 points.

Overall, it is evident that criterion iii of the STEM priority was **misunderstood.** Applications ranged from not addressing the issue of underrepresented students in STEM to describing programs that are showing impressive results. Reviewers also differed in their interpretation of the degree to which an application needed to prove the state's capacity to increase the access and success of underrepresented students in STEM. Applications were given full points to no points for Priority 2 when criterion iii was not addressed. It appears as though the instructions and training provided to reviewers for scoring Priority 2 were not sufficient to result in a consistent scoring response. Therefore, the individual reviewer's opinions about the adequacy, or even the necessity, of addressing criterion iii may have affected the scoring outcome. The most blatant of these inconsistencies included:

Washington
Washington will expand its efforts to encourage underrepresented groups to participate in STEM study and careers by contracting with the Mathematics, Engineering, Science Achievement (MESA) program coordinated by the University of Washington.

Wisconsin
Wisconsin has awarded competitive STEM grants to school districts or consortia to develop, implement, and evaluate programs designed to provide innovative instructional programs, support students who are typically underrepresented in STEM, and increase the academic achievement of students in these subjects.

Wyoming
Wyoming refers to the NASA Space Grant Women in Science conferences, which are designed to allow young women in grades 7 through 12 to learn firsthand about STEM careers from accomplished professional women.

- Some reviewers clearly did not understand that all three criteria had to be met in order for the state to earn 15 points.
- Some reviewers did not understand that programs designed for the majority of students do not necessarily work for underrepresented students.
- Many states' descriptions of their STEM plans were weak in terms of impact on underrepresented groups.
- In some cases, reviewers did not look beyond states' statements that their plans will meet the needs of underrepresented groups. For example, California explains only that "STEM curriculum and instruction must engage students who are underrepresented in STEM careers by providing them with opportunities to experience, understand, and address real-world problems." However, several of its reviewers highlighted this statement as evidence that the state satisfied criterion iii.

It is possible that some states explained their plans to address the needs of underrepresented groups in the body of the application but not in the summary, receiving full credit despite not following instructions. Reviewing all applications for this possibility was beyond the scope of this report. However, in a targeted review, we searched the entire applications of the four states that did not address criterion iii in their Phase 1 and 2 summaries but received 15 points both times nonetheless (Colorado, Kentucky, New Jersey, and South Carolina). The searches for "women," "girls," "female," and "underrepresented" revealed no hits other than in the language of the criterion itself, which signifies that they did not address criterion iii anywhere in their applications.

Of note, The New Teacher Project (TNTP) recently completed its analysis of the scores of the RTTT first round finalists and also identified problems with the scoring process. In the related policy brief, Resetting Race to the Top: Why the Competition's Future Depends on Improving the Scoring Process, TNTP "highlights concrete examples of how reviewer subjectivity, score inflation, and inconsistent scoring across applications, [and no accounting for depth of commitment] yielded a winners' circle that excluded some states whose proposals appeared to most closely reflect the stated goals of the program: to build consensus behind bold reform."

Recommendations

Recalling its goal to assist DoED in its review of the competitive grants, NAPE presents the following recommendations for DoED's consideration:

1. Provide clearer instructions for reviewers about how to score applications, especially when scoring criteria for which there is no commonly held standard or when there is an opportunity for reviewer bias, explicit or implicit, to influence the review.
2. If a priority involves multiple criteria but "all or nothing" scoring, then remind reviewers that the applicant must satisfy all criteria to earn points and require written evidence that the reviewer considered all criteria. For example each reviewer should have to check a box and comment on each of the criteria in the priority to ensure that the reviewer does not overlook a criterion.
3. Use current research, such as that produced by Building Engineering and Science Talent (BEST) and the National Science Foundation (NSF, 2003, 2006a,b), to clearly articulate the types of programs that reviewers should be looking for when reviewing programs designed for underrepresented groups.
4. Select reviewers with expertise in research and program development that have successfully increased the access and success of underrepresented groups, including women and girls, in STEM.
5. Have priority area specialists review and score priority sections of an application to ensure that individuals with adequate expertise are making priority scoring decisions. This will lead to more consistent reviews of priorities that require a particular expertise or background.
6. Continue to include in all future funding opportunities a priority for increasing the access and success of underrepresented groups, specifically women and girls, in STEM education and careers. This practice also should be conducted by other federal agencies that provide funding for education and workforce development programs in STEM.

Conclusion

NAPE would like to acknowledge the exceptional process that DoED undertook to create the RTTT application and review process. Through our work with the states we saw first-hand the level of effort and collaboration that the states devoted to respond to this funding opportunity. The use of a competitive funding process to drive innovation and change has certainly been demonstrated here. It is clear that this Administration is committed to ensuring the full participation and achievement of underrepresented students in STEM as

articulated in the competitive preference priority for STEM and the explicit criterion for preparing more students for advanced study and careers in STEM, including underrepresented groups and women and girls. It is only because of the transparency of the process that we are able to see how well the states were able to address this criterion. Unfortunately, the results were not what we hoped for.

In particular, we were surprised by how vague, simplistic or non-existent the state's responses were to criterion iii. Knowing the level of effort and existence of effective programs that target underrepresented students in STEM, we expected more explicit mention of these in the applications. Programs such as the STEM Equity Pipeline, Mathematics Engineering Science Achievement (MESA), National Girls Collaborative Project, Sally Ride Science, Girl Scouts, Upward Bound, university women in engineering programs, and other programs designed specifically to target underrepresented groups in STEM, would have been logical partners to meet this criterion. You could count on one hand the number of times programs like these were mentioned. In the future, we hope that states will reach out to existing organizations that have demonstrated expertise in creating successful outcomes for underrepresented students in STEM education and will be more creative in securing funding for such collaborations.

The inconsistencies in the scoring of Priority 2 is particularly egregious given that the state of STEM education in the United States can be explained by the lagging achievement of underrepresented students. It is these students—women and girls, low-income students, students with disabilities, African American, Hispanic, and Native American students—that schools are failing.

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Appendix A: A Summary of Applicants' Responses to Priority 2 and Reviewer's Comments and Scores — Phase 1

Alabama (15 points)

Alabama briefly describes the statewide Alabama's Girls Engaged in Math and Science University (GEMS-U) project, which works to provide nontraditional academic and career opportunities to female students and support them in the pursuit of STEM-related learning opportunities and careers.

Although four of the five reviewers awarded Alabama 15 points for this priority, they did not mention the state's compliance with criterion iii in their comments.

Arizona (0 points)

Arizona does not specify how its plans to prepare more students for advanced study and careers in STEM will address the needs of underrepresented groups.

Four reviewers assigned Arizona no points. None mentioned compliance with criterion iii in his/her comments.

Arkansas (15 points)

Arkansas states that it will use RTTT funds to implement Project STEM Starters on a statewide basis. This project is a scale-up of two U.S. Department of Education projects that demonstrated through scientifically based research and evaluation studies that they increased achievement in the core subject area of science for elementary students from underrepresented groups.

Four reviewers assigned Arkansas 15 points. None mentioned compliance with criterion iii in his/her comments.

California (0 points)

California does not specify how its plans to prepare more students for advanced study and careers in STEM will address the needs of underrepresented groups.

Four reviewers assigned California no points. None mentioned compliance with criterion iii in his/her comments.

Colorado (15 points) — Phase 1 finalist
Although Colorado states, "There is evidence that all students across the P-20 continuum need access to certain skills and experiences in order to be competitive in a STEM workforce," it does not specifically describe how its plans will address the needs of underrepresented groups.

One reviewer assigned Colorado 15 points for this priority, but commented that the state "should give more attention to isolating the problems associated with STEM criteria iii." The second reviewer assigned Colorado no points and mentioned in his/her comments that generally the plan discusses serving all students—that is, the inclusion of underrepresented groups including women and minorities is not mentioned. The third reviewer assigned Colorado 15 points and states that Colorado makes a very clear effort to prioritize STEM efforts in all its proposed activities and by doing so it will address opportunities for underrepresented groups. The fourth reviewer assigned Colorado 15 points but made no mention of criterion iii. The fifth reviewer assigned Colorado no points because "the proposed plan does not meet the three requirements for the STEM priority."

Connecticut (0 points)
Connecticut does not specify how its plans to prepare more students for advanced study and careers in STEM will address the needs of underrepresented groups.

Four reviewers assigned Connecticut no points. Of these, one commented that the state's STEM plan does not address the needs of underrepresented groups.

Delaware (15 points)—Phase 1 winner
Delaware describes three initiatives to address the needs of underrepresented groups in STEM.

1. MIT BLOSSOMS helps teachers integrate STEM content across grades and disciplines and encourages underrepresented groups to pursue STEM careers.
2. The STEM Coordinating Council and the Curriculum Workgroup will work with six to eight LEAs with the lowest performance on college readiness exams, AP exams, and poor STEM rigor to target groups traditionally underrepresented in STEM careers and courses of study, and to encourage a higher percentage of women to pursue STEM pathways.
3. The state will implement a STEM residency during the 2010-11 school year, in partnership with University of Delaware, for nontraditional candidates who have achieved a passing score on an examination of content knowledge.

All five reviewers assigned Delaware 15 points, and all but one mentioned its efforts to target underrepresented groups.

District of Columbia (0 points)—Phase 1 finalist
Washington, DC, states, "All 13 Catalyst Schools are comprehensive models (i.e., open to all students) and do not require a special admissions process, thus providing STEM access to all students – including more females (who may be underrepresented via application-only STEM programs and are underrepresented in STEM professions in general)." In other sections, DC explains that "curricular approaches take special care to engage female students in STEM subjects" and that "P-20 Consortium discussions around establishing a college-going culture will involve strategies for enhancing girls' interest in STEM-related careers."

One reviewer awarded DC no points because "the potential bridge to that goal [maximize student access to STEM futures] is not addressed as it relates to STEM enhancement across all participating LEAs and opportunities for underrepresented groups." Of the other four reviewers, two awarded 15 points and two awarded no points; none mentioned compliance with criterion iii in his/her comments.

Florida (15 points)—Phase 1 finalist
Florida describes the FCR-STEM Female-Minority Initiative, which brought together a group of education and workforce development efforts to examine policies, programs, and strategies that hold promise for increasing the state's female and minority representation in STEM courses and fields. The Initiative's final report suggests strategies to implement 21 specific recommendations with the goal of increasing student interest and awareness, improving STEM instruction, building school capacity to improve STEM education, and make informed policy decisions. Florida did not specify, however, how it would go about implementing these strategies using RTTT funds.

All five reviewers assigned Florida 15 points: two mentioned the state's efforts to address the needs of underrepresented groups.

Georgia (15 points)—Phase 1 finalist
Georgia provides significant detail about its plans regarding this priority, including the following activities to address the needs of underrepresented groups in STEM study and careers:

1. Scale the Math + Science = Success Campaign to increase the interest of students and their families in science/math, especially those from underrepresented groups.
2. Reduce gaps in student achievement in science/math by underrepresented groups through AYP policy change and retention bonuses for teachers in high-need schools who reduce the achievement gap.
3. Bring more science/math teachers representing diverse groups into Georgia classrooms through UTeach, the Math + Science = Success campaign, and through routes to certification for career-changers.

All five reviewers assigned Georgia 15 points. Their comments were strongly in favor of Georgia's overall plans related to STEM; however, only one reviewer highlighted the state's plans to target underrepresented groups.

Hawaii (15 points)
Hawaii explains that its Step-Up diploma and end-of-course exams, the SET curriculum framework, and expanded robotics, HiEST, and FIRST partnerships will give all of the state's public school students, including underrepresented students, the foundational skills for advanced study and careers in STEM.

Three reviewers assigned Hawaii 15 points. Their comments were generally very positive, but did not touch on criterion iii. The reviewers who assigned Hawaii zero points explained that the state is on the right track, but its plans do not rise to the levels required by the subcriteria.

Idaho (15 points)
With its university partners, Idaho will expand successful programs that help underrepresented students discover how STEM fields match their interests, positively influence students' perceptions of STEM careers, and increase the number of underrepresented populations who choose STEM majors in college. Specifically, Idaho will

- Provide expanded professional development to high school teachers in STEM fields
- Provide alternative routes to certification to ensure a supply of teachers qualified to teach STEM
- Institute the following programs in its lowest 5 percent districts.
  - One-week middle school STEM camps for students and teachers held at the nearest Idaho community colleges.
  - Dual credit for high school students taking STEM courses.
  - On-site and in-school opportunities to take college-level STEM courses.
  - Distance learning with the Idaho Education Network and the Idaho Digital Learning Academy.
- Contract with the University of Idaho to expand its Women in Science program.

All five reviewers assigned Idaho 15 points: two specifically mentioned the state's plans to target underrepresented groups, and one stated that the state has met all three criteria.

Illinois (15 points) — Phase 1 finalist
Illinois states that RTTT funds will be used to expand its Programs of Study model to provide a wide set of highly flexible options for students to enter STEM-related pathways, especially students that have not performed well in traditional science and math courses and other underrepresented groups in STEM fields, including women and minorities. The state has set a target of 65% of underrepresented students in LEAs participating in STEM-related Programs of Study by the final year of the grant period.

All five reviewers assigned Illinois 15 points. None mentioned compliance with criterion iii in his/her comments.

Indiana (0 points)
Indiana does not specify how its plans to prepare more students for advanced study and careers in STEM will address the needs of underrepresented groups.

Two reviewers assigned Indiana zero points but did not mention compliance with criterion iii. Two reviewers commented that the state's plan does not adequately address underrepresented groups but assigned 15 points nonetheless. The fifth reviewer assigned zero points, because "applicant does not provide sufficient evidence that it is particularly focused on addressing the needs of underrepresented groups of women and girls in STEM."

Iowa (15 points)
Iowa's only mention of commitment to gender equity in STEM study and careers relates to its involvement as a State Team in the STEM Equity Pipeline Project.

All five reviewers assigned Iowa 15 points, but only one mentioned its efforts with regard to criterion iii.

Kansas (0 points)
Kansas does not specify how its plans to prepare more students for advanced study and careers in STEM will address the needs of underrepresented groups.

All five reviewers assigned Kansas no points. Only one mentioned that the state did not satisfy criterion iii.

Kentucky (15 points) — Phase 1 finalist
Kentucky does not specify how its plans to prepare more students for advanced study and careers in STEM will address the needs of underrepresented groups.

Two reviewers awarded Kentucky zero points, but did not mention criterion iii. Of the three reviewers who awarded the state 15 points: two did not mention criterion iii, and one commented, "Because several of the teacher preparation programs are focused on placing the teachers in areas where the taking of advanced courses and the attending of college is not common, the placing of these teachers will also touch underrepresented students and women with the message that they can succeed at both—hard courses and college."

Louisiana (0 points)—Phase 1 finalist
Louisiana states that it places particular emphasis on increasing the enrollment of girls, low-income, and minority students in all AP courses. Furthermore, the Louisiana Math Science Partnership provides a model for excellent professional development in math and science, giving teachers the tools to integrate real-world STEM applications into their everyday activities and discussions. The Partnership is nationally recognized

for its significant impact on student achievement and, in particular, for increasing the achievement of low-income, minority, and special education students at a higher rate than their counterparts.

Three reviewers assigned Louisiana no points—one mentioned criterion iii. Both of the reviewers who assigned the state 15 points commented on the state's compliance with criterion iii.

Massachusetts (15 points)—Phase 1 finalist

Under a subheading, "Increase STEM college and career readiness among under-represented groups," the state explains that it will continue to emphasize STEM in MassCore, which will become the state's default high school curriculum and will include a minimum of four years of mathematics and three years of lab-based study. The state will also provide supplemental funding to LEAs to scale proven programs that embed rigorous STEM curricula in lower-performing schools. Finally the governor established a STEM Advisory Council that will serve as a central advisory body, convening various stakeholders to increase student interest in and preparation for careers in STEM fields. However, the state does not specify how these three initiatives will specifically address the needs of underrepresented groups.

All reviewers assigned Massachusetts 15 points. Three did not mention the state's compliance with criterion iii. The fourth stated that the plan should increase STEM readiness, especially among underrepresented groups. The fifth commented, "The state did not directly address the needs of women and girls in the STEM part of the proposal, but again, the results on NAEP and other measures indicates [sic] the state is headed in the right direction."

Michigan (15 points)

Michigan explains that programming through MSCN and CTE provides hands-on activities and competitions (six are specified) that are designed to attract underrepresented groups into STEM career paths. Furthermore, through a research collaborative, the state can examine issues and track progress in STEM participation and learning, such as access to STEM coursework across schools, equity in student achievement in STEM across subgroups, and the movement of underrepresented populations into STEM at the postsecondary level.

All five reviewers assigned Michigan 15 points: of these, three mentioned the state's efforts to address the needs of underrepresented groups.

Minnesota (15 points)

Minnesota states that through RTTT it will increase the number of underrepresented minority and high-poverty students who enroll in rigorous courses that put them on track for STEM career success through multiple rigorous programs including AP, CLEP, and IB. Past success with this model has led to an increase of 10-35 percent overall in both participation and achievement of non-white students. Furthermore, Minnesota is one of the states involved in the STEM Equity Pipeline Project.

All five reviewers awarded Minnesota 15 points. One mentioned the state's efforts to target underrepresented groups in his/her comments, three did not. The fifth made the following comment: "The state makes a very clear effort to prioritize STEM efforts in all its proposed activities…by doing so in all participating LEAs, it will address opportunities for underrepresented groups in STEM opportunities."

Missouri (0 points)

Missouri's only mention of its plans to address the needs of underrepresented groups is its involvement in the STEM Equity Pipeline Project.

Only two reviewers assigned Missouri 15 points. Of these, one mentioned the state's efforts to address the needs of underrepresented groups, and the other commented: "There were lesser amounts of attention given to building career tracks, especially for women and minorities. Because reviewers are required to give all

or no points, this proposal will be given 15 points." The remaining three did not mention criterion iii in their comments.

Nebraska (15 points)
Nebraska explains that its STEM Academy works closely with local schools to reach out to girls and students from other underrepresented groups, encouraging and supporting their participation in the STEM Academy courses and experiential activities designed specifically to address their needs.

All five reviewers assigned Nebraska 15 points. One mentioned the specific inclusion of underrepresented groups in the state's STEM plan. Another commented that "the plan could be more specific about how it will address the needs of underrepresented groups in STEM."

New Hampshire (15 points)
New Hampshire explains that STEM Professional Learning Communities will be implemented in the priority schools, focusing on best practices, examination of data, and related actions with data analysis and learning how to effectively target underrepresented groups for STEM-related careers. Priority schools and districts will complete a multi-layered review of their existing STEM-related course offerings to identify gaps and guide plans to increase access to courses. Furthermore, New Hampshire is a State Team involved in the STEM Equity Pipeline Project and is independently working with NAPE to promote equity in STEM content.

All five reviewers assigned New Hampshire 15 points. Two mentioned compliance with criterion iii in his/her comments.

New Jersey (15 points)
New Jersey does not specify how its plans to prepare more students for advanced study and careers in STEM will address the needs of underrepresented groups.

Four reviewers assigned New Jersey 15 points but did not mention its compliance with criterion iii in their comments. The fifth assigned the state no points because, among other issues, the STEM plan does not adequately the address the needs of underrepresented groups.

New Mexico (15 points)
New Mexico explains that assessment will be a large component of its Serious Games for Serious Change Challenge to "determine the effects of serious gaming on the underserved and minority students (as well as female)." Furthermore Innovate-Educate (public/private partner) will recruit students (with a priority on minority and female) in computing beginning as early as fifth grade.

All five reviewers assigned New Mexico 15 points. Three mentioned the inclusion of underrepresented groups in the STEM plan.

New York (15 points)—Phase 1 finalist
New York does not specify how its plans to prepare more students for advanced study and careers in STEM will address the needs of underrepresented groups.

Three reviewers assigned New York 15 points. One reviewer did not comment on the state's compliance with criterion iii. However, the other two offered the following comments.

"While the applicant as a whole has met the competitive priority, the Applicant could expand upon strategies to address under-represented groups such as minorities and women for greater inclusion in STEM programs" and "It should be noted that the application does not address the needs of underrepresented groups and women and girls."

The remaining reviewers assigned the state no points because the state did not present sufficient evidence that its plan will result in the preparation of more students for advanced study and careers in STEM, including underrepresented groups.

North Carolina (15 points)—Phase 1 finalist

North Carolina mentions the Math and Science Education Network Pre-College Programs on nine UNC campuses, which prepare underserved students at the middle and high school levels for careers in the STEM areas, and the NC State Women in Engineering Outreach Program that encourages young girls and women to consider careers in the STEM disciplines.

All five reviewers assigned North Carolina 15 points, and all but one mentioned its efforts to address the needs of underrepresented groups in their comments.

Ohio (15 points)—Phase 1 finalist

Ohio's only mention of its efforts regarding underrepresented groups is that "the OSLN [Ohio STEM Learning Network] also will continue to connect education and economic development efforts such as the Third Frontier Project to enrich the STEM talent pipeline particularly for students from underrepresented populations."

All five reviewers assigned Ohio 15 points. Only one commented on the state's compliance with criterion iii.

Oklahoma (0 points)

Oklahoma explains that it plans to "escalate innovation in STEM education" by creating "a STEM Coordinating Council that will be responsible for connecting, sharing, and building on the work of existing STEM initiatives, including…(ii) enhancing STEM teaching and learning capacity and increase the number of underrepresented student groups and female students' completing STEM programs of study" and by strategically placing additional STEM academies to reach underrepresented and female students.

Only two reviewers assigned Oklahoma 15 points. Of the five only one commented on the state's compliance with criterion iii: "One specific shortcoming is that it is not sufficiently clear how applicant intends to address the needs of underrepresented groups and of women and girls in the areas of [STEM]."

Oregon (15 points)

Oregon mentions that the Oregon Preengineering and Applied Science Initiative works with partners to implement its STEM strategy with an emphasis on increasing the quantity and diversity of students motivated and prepared for STEM careers.

All five reviewers assigned Oregon 15 points. One commented on the state's efforts to address the needs of underrepresented groups, and one commented on the state's efforts to close the STEM achievement gap.

Pennsylvania (15 points)—Phase 1 finalist

Pennsylvania's only mention of its plans to address the needs of underrepresented girls is a partnership between the National Girls Collaborative Project and Carnegie Mellon in Pittsburgh to continue and improve the Click! Summer camp for girls (an innovative urban science adventure program designed specifically for middle school girls).

Three reviewers assigned Pennsylvania 15 points. None of the reviewers commented on the state's compliance with criterion iii.

Rhode Island (15 points)—Phase 1 finalist
Rhode Island does not specify how its plans to prepare more students for advanced study and careers in STEM will address the needs of underrepresented groups.

All five reviewers assigned Rhode Island 15 points. However, three offered the following comments:

- "[W]hile there was enough there to award the points, there are some important missing elements including…little to no attention to reaching out to underrepresented students and girls."
- "On the negative, there is no clear sense of a plan that would, for example, address the needs of underrepresented groups and of women and girls in STEM fields."
- "However, the application has overlooked efforts to improve the representation of underrepresented groups—including women and girls in STEM programs."

South Carolina (15 points) — Phase 1 finalist
South Carolina does not specify how its plans to prepare more students for advanced study and careers in STEM will address the needs of underrepresented groups.

However, all five reviewers assigned the state 15 points. None mentioned the state's compliance with criterion iii in his/her comments.

South Dakota (15 points)
South Dakota proposes to use the majority of its Race to the Top funds to establish a year-round residential STEM-based program for American Indian students. The American Indian Institute for Innovation would support students from the beginning of high school through their first two years of college.

All five reviewers assigned the state 15 points. Three commented on the state's inclusion of Native Americans in its STEM plan.

Tennessee (15 points) — Phase 1 winner
Tennessee discusses its STEM Innovation Network, a network of innovative teachers, schools, and districts to support and learn from each other in affecting student outcomes in the STEM disciplines, particularly for underrepresented students. It will be managed by the state in partnership with Battelle Memorial Institute in its role as the co-operator of Oak Ridge National Laboratory and modeled on the successful Ohio STEM Learning Network.

All five reviewers awarded Tennessee 15 points. Three mentioned the state's efforts with regard to criterion iii.

Utah (15 points)
Utah explains that its Early College High Schools offer students an opportunity to complete college credits and earn STEM associate degrees while completing high school and target and recruit girls and other students from underrepresented groups.

All five reviewers awarded Utah 15 points. Four did not comment on the state's efforts with regard to criterion iii. The fifth reviewer stated that more information about criteria iii would have strengthened the application.

Virginia (15 points)
Virginia explains that it received a grant from the National Math and Science Initiative to expand access to college-level courses for traditionally underrepresented students through the Advance Placement Training and Incentive Program. Virginia will use RTTT to fund the College Board's Laying the Foundation component of the program. Additionally, the state plans to add eight additional Governor's Career and Technical STEM

Academies, which, before opening, undergo a rigorous review of their ability to expand options for underrepresented groups to acquire STEM literacy and other critical skills, knowledge, and credentials that will prepare them for STEM careers in Virginia

All five reviewers assigned Virginia 15 points. Two provided positive comments about the state's compliance with criterion iii. A third commented: "The proposal could have given more attention to programs that encourage underrepresented populations. However, plans to expand the current number of Governor's Career and Technical Stem Academies will likely help this concern. Because the reviewers are required to give all or none points to this section, the proposal will be given 15 points."

West Virginia (0 points)
The application for West Virginia that is posted on the DOE's website is incomplete; therefore, we were not able to review its response to Priority 2.

However, four reviewers assigned the state no points; two specifically commented that the state's plan does not address the needs of underrepresented groups and women and girls. The only reviewer to assign the state 15 points commented: "The state is making efforts to prepare more students for advanced study and careers in the STEM fields. Properly and thoroughly implemented, these initiatives are likely to reach underrepresented groups with its efforts."

Wisconsin (15 points)
Wisconsin explains that Project Lead the Way has received state support from a variety of sources to expand its engineering program to schools around the state. In addition, the state has awarded competitive STEM grants to school districts or consortia to develop, implement, and evaluate programs designed to provide innovative instructional programs, support students who are typically underrepresented in STEM, and increase the academic achievement of students in these subjects.

All five reviewers assigned Wisconsin 15 points. Three did not mention the state's compliance with criterion iii. Two commented that Project Lead the Way addresses the needs of underrepresented groups.

Wyoming (0 points)
Wyoming refers to the NASA Space Grant Women in Science conferences, which are designed to allow young women in grades 7 through 12 to learn firsthand about STEM careers from accomplished professional women. By presenting positive role models in the science, mathematics, and technological fields, these programs encourage all students (especially young women and minorities) to pursue higher education and careers in mathematics and science.

The reviewers held Wyoming to especially high standards. None assigned the state 15 points. Four reviewers' comments follow:

- "All of these programs appear to be promising. However, the Competitive Priority in STEM criterion clearly states that to earn the priority points, a state must address this priority throughout its application. This is not true of Wyoming's application."
- "However, Wyoming did not address how STEM will be a [sic] ongoing effort and will be embedded in each area of their application. Stem was mainly dealt with as a seperate [sic] area and not integrated thoughout [sic] their plan."
- "The application did not sufficiently integrate the three elements needed to be successful with STEM."
- "The state's plan did not reflect a high quality plan that involved industry experts and other community resources that could assist teachers in integrating STEM content across disciplines and grades, nor did it address extensively the need for addressing the needs of underrepresented groups and of women and girls."

Table A1: Findings from Analysis of Phase 1 Applications (5 reviewers per application)

State	Total Score (No. Reviewers Who Awarded 15 Pts)	State Addresses Ciii?	State Addresses Women & Girls?	No. Reviewers Who Mention Ciii	No. Reviewers Who Awarded 15 Pts and Said Ciii Met	No. Reviewers Who Awarded 15 Pts But Did Not Mention Ciii	No. Reviewers Who Awarded 15 Pts But Said Ciii Not Met	No. Reviewers Who Awarded 15 Pts and Said Plans to Reach All Meet Ciii	No. Reviewers Who Awarded 0 Pts and Said Ciii Not Met
AL	15 (4)	Y	Y	0		0			
AZ	0 (1)	N	N	0		0			
AR	0 (4)	Y	N	0		0			
CA	0 (1)	N	N	0		0			
CO	15 (3)	N	N	4		1	1	1	2
CT	0 (1)	N	N	1		0			1
DE	15 (5)	Y	Y	4	4	1			
DC	0 (2)	Y	Y	1		2			1
FL	15 (5)	Y	Y	2	2	3			
GA	15 (5)	Y	N	1	1	1			
HI	15 (3)	Y	N	0		3			
ID	15 (5)	Y	Y	3	3	2			
IL	15 (5)	Y	Y	0		5			
IN	0 (2)	N	N	3		0	2		1
IA	15 (5)	Y	Y	1	1	4			
KS	0 (0)	N	N	1		N/A		1	
KY	15 (3)	N	N	1		2		1	
LA	0 (2)	Y	Y	3	2	0			1
MA	15 (5)	Y	N	2		3	2		
MI	15 (5)	Y	N	3	3	2			
MN	15 (5)	Y	N	2	1	3		1	
MO	0 (2)	Y	N	2	1	0	1		
NE	15 (5)	Y	Y	2	1	3	1		
NH	15 (5)	Y	N	2	2	3			
NJ	15 (4)	N	N	1		4			1
NM	15 (5)	Y	Y	3	3	2			2
NY	15 (3)	Y	N	4		1	2		2
NC	15 (5)	Y	Y	4	4	1			
OH	15 (5)	Y	N	1	1	4			
OK	0 (2)	Y	Y	1	1	0			
OR	15 (5)	Y	N	2	2	3			1
PA	15 (3)	Y	Y	0		3			
RI	15 (5)	N	N	3		2	3		
SC	15 (5)	N	N	0		5			
SD	15 (5)	Y	N	3	3	2			
TN	15 (5)	Y	N	3	3	2			
UT	15 (5)	Y	Y	1		4	1		
VA	15 (5)	Y	N	3	2	2		1	
WV	0 (1)	N	N	3		0		1	2
WI	15 (5)	Y	N	2		3		2	
WY	0 (0)	Y	Y	0		N/A			1
Totals		**30Y**	**15Y**	**72**	**40**	**76**	**13**	**8**	**15**

Appendix B: A Summary of Applicants' Responses to Priority 2 and Reviewer's Comments and Scores — Phase 2

Alabama (0 points)

Alabama briefly describes the statewide Alabama's Girls Engaged in Math and Science University (GEMS-U) project, which provides nontraditional academic and career opportunities to female students and supports them in the pursuit of STEM-related learning opportunities and careers. Additionally, Alabama plans to establish an advisory council that will, among other things, develop a strategy to prepare underrepresented groups for careers in STEM fields.

Four reviewers assigned Alabama no points. Of these, two commented that the state's STEM plan does not address the needs of underrepresented groups, one commented that the attention to underserved groups is commendable, and one did not comment about criterion iii. The reviewer who assigned 15 points commented that the state's STEM plan addresses the needs of underrepresented groups.

Arizona (15 points) — Phase 2 finalist

With RTTT funds, Arizona will establish SFAz STEM, which will expand access to rigorous courses and prepare more students, especially those from underrepresented groups, for advanced STEM study and careers. Furthermore, the state will continue with its Rural Engineering Pathway (REP) model, which was developed in one county to provide early college and internationally recognized industry certifications for high school students in engineering. REP, of which 48% of participants are female and 27% are Hispanic, includes programs for hands-on learning; rigorous and otherwise unavailable algebra and pre-calculus courses to increase preparation in early grades; and pre-engineering courses that transfer to an Arizona University.

All five reviewers Arizona assigned 15 points and commented that the state's STEM plan will address the needs of underrepresented groups.

Arkansas (15 points)

Arkansas does not specify how its plans to prepare more students for advanced study and careers in STEM will address the needs of underrepresented groups.

All five reviewers assigned Arkansas 15 points. One commented that the state's commitment to underrepresented groups is minimal, because only one sentence references women and only one references racial and ethnic groups. Another reviewer interprets Arkansas' statement that its Environmental and Space Initiative "is for everyone and … reflects the diversity of every school" to mean that it will work particularly well with underrepresented groups. Of the remaining three reviewers, one also mentioned the state's compliance with criterion iii.

California (15 points)—Phase 2 finalist

California explains only that "STEM curriculum and instruction must engage students who are underrepresented in STEM careers by providing them with opportunities to experience, understand, and address real-world problems." That was good enough for four of the reviewers—they referenced that quote and assigned the state 15 points.

Colorado (15 points)—Phase 2 finalist

Colorado states that its STEM initiatives will further its agenda "to increase capacity, replicate best practices, and increase representation of minorities and girls in STEM-related careers."

Three reviewers assigned Colorado 15 points. One commented that the state met criterion iii by virtue of the above quote. The two who assigned no points commented that the state did not specify its plans to address the needs of underrepresented groups.

Connecticut (0 points)
Connecticut explains that with the Partnership for High School, College, and Workforce Alignment as its lead group, "the activities described throughout this application will form the basis of a comprehensive plan for STEM education and innovation linked to … and genuine engagement of all next generation learners, particularly elementary school children and underrepresented groups like girls, students of color and English language learners (ELL) students." Furthermore, it will inspire and prepare more students, especially those who are traditionally underrepresented in STEM fields, for success in college-level STEM courses and rewarding STEM careers by assuring that all students have access to a sustained, coherent, and rigorous K-12 STEM education programs and by providing after school and community programs, internships, apprenticeships, mentors, and other authentic experiences that develop workforce competencies.

All five reviewers assigned Connecticut no points. Of these, one commented that the state's STEM plan does not address the needs of underrepresented groups.

District of Columbia (15 points) — Phase 2 winner
The District of Columbia explains that the P-20 Consortium discussions around establishing a college-going culture will involve strategies for enhancing girls' interest in STEM-related careers.

All five reviewers assigned DC 15 points. One commented that DC only makes a passing reference to women in science. Another commented that DC met criterion iii by repeating what DC said about the P-20 consortium. A third reviewer simply stated that DC's plans address the needs of underrepresented groups.

Florida (15 points) — Phase 2 winner
Florida describes in detail the goals and recommendations of the FCR-STEM Female-Minority Initiative, which brought together a group of education and workforce development efforts to examine policies, programs, and strategies that hold promise for increasing the state's female and minority representation in STEM courses and fields. The state also explained 10 initiatives that will help more students—including underrepresented groups—prepare for advanced STEM study and careers.

Four reviewers assigned Florida 15 points and mentioned the state's efforts to address the needs of underrepresented groups.

Georgia (15 points) — Phase 2 winner
Georgia provides significant detail about its plans regarding this priority, including about the following activities:

1. Scale the Math + Science = Success Campaign to increase the interest of students and their families in science/math, especially those from underrepresented groups.
2. Reduce gaps in student achievement in science/math by underrepresented groups through AYP policy change and retention bonuses for teachers in high-need schools who reduce the achievement gap.
3. Bring more science/math teachers representing diverse groups into Georgia classrooms through UTeach, the Math + Science = Success campaign and through routes to certification for career-changers.

All five reviewers assigned Georgia 15 points. Four highlighted the state's plans to target underrepresented groups.

Hawaii (15 points) — Phase 2 winner
Hawaii explains that Native Hawaiian and Micronesian Pacific Islander students are the direct beneficiaries of investments in programs and academies designed to develop STEM-based skills and knowledge. The state's Women in Technology project administers funding from Act 271, which provided $1.1M in matching

funds for Project EAST in rural schools on Hawaii's geographically isolated neighbor islands and four schools on Oahu, serving about 600 students annually. The project encourages girls, women, and other underrepresented groups to pursue STEM careers and involves local business partners who provide technology resources and support for participating schools.

Five reviewers assigned Hawaii 15 points; all but one mentioned the state's compliance with criterion iii.

Illinois (15 points) — Phase 2 finalist
Illinois states that its Programs of Study model provides a wide set of highly flexible options for students to enter STEM-related pathways, especially for students that have not performed well in traditional science and math courses and other underrepresented groups in STEM fields, including women and minorities.

All five reviewers assigned Illinois 15 points. Four mentioned compliance with criterion iii in his/her comments.

Iowa (0 points)
Iowa's application does not include a discussion of Priority 2. Three reviewers assigned Iowa no points. The two that assigned 15 points mentioned the state's efforts with regard to criterion iii.

Kentucky (15 points) — Phase 2 finalist
Kentucky does not specify how its plans to prepare more students for advanced study and careers in STEM will address the needs of underrepresented groups.

All five reviewers assigned Kentucky 15 points. One commented that the proposal does not address the underrepresented groups. Another would have liked to see more attention given to women and minority populations. Another noted that gender and minority issues were addressed in the appendices. The final two commented that the state addressed the needs of underrepresented groups.

Louisiana (15 points) — Phase 2 finalist
Louisiana's STEM Goal Office will work with schools to increase the participation of students, including those from underrepresented groups, in expanded course offerings. The Office will track course-taking and success by school, disaggregating the data by gender and socioeconomic groups to assess progress and hold schools accountable. This data will also inform efforts to create and expand applied learning opportunities for students. Of the various opportunities described, the following mention a focus on underrepresented groups: Southern University's summer science camps, Science Adventures Summer Camps, LSU's Xcite program, and Sally Ride Science Festivals.

All five reviewers assigned Louisiana 15 points and mentioned the state's plans to address the needs of underrepresented groups.

Maine (0 points)
Maine did not summarize its STEM plans in the Priority section of the application. However, each reviewer commented on the state's plans, so it can be assumed that the state discussed them throughout the application. Three reviewers assigned the state no points and specifically mentioned that its plans do not address the needs of underrepresented groups. The other two reviewers did not mention criterion iii.

Maryland (15 points) — Phase 2 winner
Maryland's provides substantial detail about its STEM plans and highlights certain initiatives that align directly with the Priority 2 criteria. However, the only mention of underrepresented groups occurs when the state lists the objectives of its STEM Innovation Network, including "to secure and target resources to disseminate effective models to benefit and serve all students, particularly low-income students and students of color."

All five reviewers awarded Maryland 15 points. Four did not mention criterion iii. The fifth commented that the state's "plans to provide STEM internships, co-ops, or lab experiences for all interested high school and college students to jump-start their successful transition to the workplace" satisfy criterion iii.

Massachusetts (15 points) — Phase 2 winner
Under a subheading, "Increase STEM college and career readiness among under-represented groups," Massachusetts explains that it will continue to emphasize STEM in MassCore, which will become the state's default high school curriculum and will include a minimum of four years of mathematics and three years of lab-based study. The state will also provide supplemental funding to LEAs to scale proven programs that embed rigorous STEM curricula in lower-performing schools. However, the state does not specify in the Priority section how these three initiatives will specifically address the needs of underrepresented groups. The reader is referred to a section in the body of the application that states "early exposure to rigorous curricula and college-level work is a proven strategy for increasing college and career readiness, particularly for low-income and minority students." The state will promote this exposure through two activities: pre-AP teacher training and STEM Early College High Schools, and provides details about these initiatives.

All reviewers assigned Massachusetts 15 points and commented that the state's STEM plan will address the needs of underrepresented groups.

Michigan (15 points)
Michigan's Mathematics and Science Centers Network and Career and Technical Education provide hands-on activities and competitions designed to attract underrepresented groups into STEM career paths, including First Robotics, the Real World Design Challenge, You Be the Chemist, the Girls Math Science Conference, a mentoring program with the Girl Scouts, and weekly sessions with rural students. In addition, the state participates in efforts with external funders to provide STEM-rich activities to students. For example, 4,800 students in 80 sites across Michigan participate in the Ford Partnership for Advanced Studies (Ford PAS), which is an academically rigorous, interdisciplinary curriculum and program that provides students with content knowledge and skills necessary for future success. An expansion of the State Longitudinal Data System (SLDS) will allow for an examination of the results of those and other efforts.

All five reviewers assigned Michigan 15 points; four mentioned compliance with criterion iii.

Mississippi (0 points)
To ensure a high level of rigor, students in Mississippi must take introductory courses at their home middle and high schools and then complete an application to attend the Center for Professional Futures for the academy of their choice. A marketing plan that appeals directly to groups that have been historically underrepresented in the STEM field such as those from lower socioeconomic backgrounds, minorities, and female students will be conducted to encourage increased number of applicants.

Four reviewers assigned Mississippi no points. The reviewer that assigned 15 points is the only one that commented on the state's plans to address the needs of underrepresented groups.

Missouri (0 points)
Missouri does not specify how its plans to prepare more students for advanced study and careers in STEM will address the needs of underrepresented groups. For this reason, four reviewers assigned the state no points. The fifth reviewer commented: "Missouri's major shortfall with its proposed STEM programs is that there is no specific mention that they are designed for underrepresented groups. The hope and assumption is that Missouri's robust plan for advancing STEM with students will directly benefit women and girls, and other underrepresented groups. The strength of the plan outweighs this oversight of a key element of the criterion."

Montana (0 points)
Montana does not specify how its plans to prepare more students for advanced study and careers in STEM will address the needs of underrepresented groups. For this reason, all five reviewers assigned the state no points.

Nebraska (15 points)
Nebraska explains that its STEM Academy works closely with local schools to reach out to girls and students and other groups underrepresented in STEM areas, encouraging and supporting their participation in the STEM Academy courses and experiential activities designed specifically to address their needs.

Four reviewers assigned Nebraska 15 points. Of these, two commented that the state meets criterion iii. The reviewer who assigned the state no points did so because the state does not have a specific plan to reach out to underrepresented groups.

Nevada (0 points)
Nevada will expand initiatives such as the University of Nevada's Girl's Math Camp, the Mathematics, Engineering, Science and Achievement Program, summer engineering camps, and the UNLV's Upward Bound Program to enable greater access for underrepresented groups to enter and be successful in STEM education and careers.

Three reviewers assigned the state no points. Of these, two commented that the state's plans do not specifically address the issue of women and girls in a meaningful way. Of the two who assigned 15 points, one commented that the state's plans to reach out to all students satisfies criterion iii.

New Hampshire (0 points)
New Hampshire did not provide a narrative in the Priority 2 section of the application. The state described its STEM plans within the body of the application, but each reviewer considered them to be not comprehensive and assigned the state no points.

New Jersey (15 points) — Phase 2 finalist
New Jersey does not specify how its plans to prepare more students for advanced study and careers in STEM will address the needs of underrepresented groups.

The scoring is unclear because there two tiers, and one tier was split. However, it appears as though three reviewers assigned New Jersey 15 points. Of these, one commented that there was minimal discussion of career opportunities for girls, women, and minorities. Of the two reviewers who assigned the state no points, one commented that the state did not address the needs of underrepresented groups.

New Mexico (15 points)
One of New Mexico's proposed projects will be overseen by Innovate-Educate (public/private partner) and will involve recruiting students (with a priority on minorities and females) in computing beginning as early as fifth grade.

Four reviewers assigned New Mexico 15 points. Only one mentioned the inclusion of underrepresented groups in the STEM plan.

New York (15 points) — Phase 2 winner
New York includes in its STEM plans the following objectives:

- Review and scale-up initiatives for all students, but particularly underrepresented groups, including minorities and women.
- Support innovation in low-performing schools to integrate STEM throughout the curriculum with a particular focus on underrepresented populations, including women, economically disadvantaged students, and minorities.
- Set targets and goals to increase achievement, particularly for historically underperforming groups in science and mathematics.
- Provide grants for supplemental compensation for teachers of STEM/ELLs/SWDs to work in high need schools (which include underrepresented groups and women and girls in STEM fields), and for the new expedited pathway for individuals with advanced degrees in the STEM areas to teach in high need schools.

All five reviewers assigned New York 15 points; all but one mentioned that its plans address the needs of underrepresented groups.

North Carolina (15 points) — Phase 2 winner
North Carolina mentions the Math and Science Education Network Pre-College Programs on nine UNC campuses, which prepare underserved students at the middle and high school levels for careers in the STEM areas, and the NC State Women in Engineering Outreach Program that encourages young girls and women to consider careers in the STEM disciplines.

All five reviewers assigned North Carolina 15 points, and all mentioned its efforts to address the needs of underrepresented groups in their comments.

Ohio (15 points) — Phase 2 winner
Ohio states a goal of doubling the number of students pursuing STEM academic majors in college and quadrupling the number of students from underrepresented populations. Ohio's only other mention of its efforts regarding underrepresented groups is that "the OSLN [Ohio STEM Learning Network] also will continue to connect education and economic development efforts such as the Third Frontier Project to enrich the STEM talent pipeline particularly for students from underrepresented populations."

Four reviewers assigned Ohio 15 points. Of these, two commented that the state's STEM plans address the needs of underrepresented groups, and two commented that its plans address the needs of all students and therefore underrepresented groups as well. The reviewer who assigned no points commented that the state's plans do not adequately address the needs of underrepresented groups.

Oklahoma (15 points)
Oklahoma's main strategies to address the needs of underrepresented groups include

- Creating "a STEM Coordinating Council that will be responsible for connecting, sharing, and building on the work of existing STEM initiatives"
- Teaching students that academic abilities are expandable and improvable
- Ensuring that underrepresented students are exposed to exceptional STEM experiences early and often
- Providing professional development to STEM teachers to understand the neuroscience of learning, especially how previous life experiences and experiential learning continue to build synaptic connections over a lifetime
- Promoting partnerships pairing minority students to minority STEM industry workers through programs such as Project Exploration

All five reviewers assigned Oklahoma 15 points; three commented that the state's STEM plans address the needs of underrepresented groups.

Pennsylvania (15 points) — Phase 2 finalist
Pennsylvania's STEM initiative regional centers support numerous local programs specifically targeted to increasing participation of underrepresented groups in STEM, including women and girls, including participation in the National Girls Collaborative Project at Carnegie Mellon Science Center, which recently was awarded $200,000 to expand its innovative urban science adventure program designed specifically for middle school girls.

Four reviewers assigned Pennsylvania 15 points. Of these, two commented that the state's STEM plans address the needs of underrepresented groups. The reviewer who assigned the state no points commented that the state's STEM plans do not adequately address the needs of underrepresented groups.

Rhode Island (15 points) — Phase 2 winner
Rhode Island explains that it has a strong history of collaboration with its universities, industry partners, and informal education centers regarding innovative STEM initiatives. Several of these programs, such as Girls Reaching Remarkable Levels TECH and Brown's Women in Science and Engineering, specifically target middle-school and high-school girls.

All five reviewers assigned Rhode Island 15 points; four commented on its plans to address the needs of underrepresented groups, although one commented that the focus is on women and girls and not on other underrepresented students.

South Carolina (15 points) — Phase 2 finalist
South Carolina states that current student outreach programs will be expanded to inform and recruit additional minority and female students to enroll in STEM programs of study.

All five reviewers assigned the state 15 points. However, one commented that conducting "outreach to minorities and females is not the same as addressing the needs of underrepresented groups and women and girls." Another noted a lack of specificity of ways to encourage females. The others did not mention the state's plans to address the needs of underrepresented groups.

Utah (15 points)
Utah explains that its Early College High Schools offer students an opportunity to complete college credits and earn STEM associate degrees while completing high school and target and recruit girls and other students from underrepresented groups. In addition, its MESA (Mathematics Engineering and Science Achieve-

ment) program was developed to increase the number of underserved, ethnic, minority, and female students who pursue coursework, advanced study, and careers in STEM.

Four reviewers awarded Utah 15 points; two commented on the state's efforts with regard to criterion iii. The fifth reviewer commented that the state's plans to meet the needs of underrepresented groups are not high quality.

Washington (15 points)

Using RTTT funds, Washington will expand its efforts to encourage underrepresented groups to participate in STEM study and careers by contracting with the Mathematics, Engineering, Science Achievement (MESA) program coordinated by the University of Washington. Under the contract, MESA will provide tested programs that meet students' immediate needs for academic support, challenge them to achieve at high levels of mathematics and science, and inspire them to excel and envision their own success. It will increase the number of Black, Native American, and Hispanic youth who successfully transition from middle school to high school, equip them to excel in gateway coursework, and assist them to keep on track for college and careers in STEM.

All five reviewers assigned Washington 15 points. Three commented on the state's plans to address the needs of underrepresented groups, although one commented that the state's focus on the STEM preparation of such groups is weak.

Wisconsin (15 points)

Wisconsin does not specify how its plans to prepare more students for advanced study and careers in STEM will address the needs of underrepresented groups.

Four reviewers assigned Wisconsin no points and commented that the state did not address criterion iii. The fifth reviewer assigned the state 15 points despite noting that the plan does not "mention targeting specific subgroups of students traditionally unexposed or denied access to STEM courses."

Table B1: Findings from Analysis of Phase 2 Applications

State	Total Score (No. Reviewers Who Awarded 15 Pts)	State Addresses Ciii?	State Addresses Women & Girls?	No. Reviewers Who Mention Ciii	No. Reviewers Who Awarded 15 Pts and Said Ciii Met	No. Reviewers Who Awarded 15 Pts But Said Ciii Not Met	No. Reviewers Who Awarded 15 Pts but Did Not Mention Ciii	No. Reviewers Who Awarded 15 Pts and Said Plans to Reach All Meet Ciii	No. Reviewers Who Awarded 0 Pts and Said Ciii Not Met
AL	0 (1)	Y	Y	4			0		2
AZ	15 (5)	Y	Y	5	5		0		
AR	15 (5)	N	N	3	1	1	2	1	
CA	15 (4)	N	N	4	4		0		
CO	15 (3)	N	N	3	1		2		2
CT	0 (0)	Y	Y	1			N/A		1
DC	15 (5)	Y	Y	3	2	1	2		1
FL	15 (4)	Y	Y	4	4		0		
GA	15 (5)	Y	N	4	4		1		
HI	15 (5)	Y	Y	4	4		1		
IL	15 (5)	Y	Y	4	4		1		
IA	0 (2)	Y	N	2	2		0		
KY	15 (3)	N	N	5	3	2	0		
LA	15 (5)	Y	Y	5	5		0		
ME	0 (2)	N	N	3			2		3
MD	15 (5)	Y	N	1			4	1	
MA	15 (5)	Y	N	5	5		0		
MI	15 (5)	Y	Y	4	4		1		
MS	0 (1)	Y	N	1	1		0		
MO	0 (1)	N	N	5			0	1	4
MT	0 (0)	N	N	5			N/A		5
NE	15 (4)	Y	Y	3	2		2		1
NV	0 (2)	Y	Y	3	1		1		2
NH	0 (0)	N	N				N/A		
NJ	15 (3)	N	N	2		1	2		1
NM	15 (4)	Y	Y	1	1		4		
NY	15 (5)	Y	Y	4	4		1		
NC	15 (5)	Y	Y	5	5		0		
OH	15 (4)	Y	N	5	2		0	2	1
OK	15 (5)	Y	N	3	3		2		
PA	15 (4)	Y	Y	3	2		2		1
RI	15 (5)	Y	Y	4	4		1		
SC	15 (5)	N	N	2		2	3		
UT	15 (4)	Y	Y	3	2		2		1
WA	15 (5)	Y	N	3	2	1	2		
WI	0 (1)	N	N	5		1	0		4
Total		**25Y**	**17Y**	**121**	**77**	**9**	**38**	**5**	**29**