

**U.S. Department of Education - EDCAPS  
G5-Technical Review Form (New)**

Status: Submitted

Last Updated: 09/15/2023 03:46 PM

## Technical Review Coversheet

Applicant: New York Hall of Science (S411C230141)

Reader #1: \*\*\*\*\*

	Points Possible	Points Scored
<b>Questions</b>		
<b>Selection Criteria</b>		
<b>Significance</b>		
1. Significance	20	20
<b>Quality of Project Design</b>		
1. Project Design	30	28
<b>Quality of Project Personnel</b>		
1. Project Personnel	10	10
<b>Quality of the Management Plan</b>		
1. Management Plan	10	10
<b>Sub Total</b>	70	68
<b>Priority Questions</b>		
<b>Competitive Preference Priority</b>		
<b>Competitive Preference Priority 1</b>		
1. Promoting Equity	5	0
<b>Competitive Preference Priority 2</b>		
1. Workforce Diversity	2	0
<b>Sub Total</b>	7	0
<b>Total</b>	77	68

# Technical Review Form

Panel #10 - EIR Early-Phase - 10: 84.411C

Reader #1: \*\*\*\*\*

Applicant: New York Hall of Science (S411C230141)

## Questions

### Selection Criteria - Significance

1. The Secretary considers the significance of the proposed project. In determining the significance of the proposed project, the Secretary considers the following factor:

Reader's Score: 20

#### Sub

1. (1) The extent to which the proposed project involves the development or demonstration of promising new strategies that build on, or are alternatives to, existing strategies. (20 points)

#### Strengths:

The applicant is proposing a "civic science education" program that builds on previous research and provides innovative science instruction to middle school students. The applicant proposes a professional development model based on some of the newest research in the field of science education (p.e21). For example, Next Generation Science Standards three-dimensional science learning (p. e22) and Ambitious Science Teaching (p. e25) are proven methods aimed at increasing scientific inquiry and student engagement.

#### Weaknesses:

No Weaknesses noted.

Reader's Score: 20

### Selection Criteria - Quality of Project Design

1. The Secretary considers the quality of the design of the proposed project. In determining the quality of the design of the proposed project, the Secretary considers the following factors:

Reader's Score: 28

#### Sub

1. (1) The extent to which there is a conceptual framework underlying the proposed research or demonstration activities and the quality of that framework. (10 points)

#### Strengths:

The proposal is based on both Ambitious Science Teaching (p. e25) and the Scale Immersion Model for Professional Learning (p. e27). These are both well-researched frameworks that include information regarding

**Sub**

inquiry based pedagogy and place based science education.

**Weaknesses:**

The applicant did not include a logic model.

**Reader's Score: 8**

**2. (2) The extent to which the goals, objectives, and outcomes to be achieved by the proposed project are clearly specified and measurable. (5 points)**

**Strengths:**

The goals and objectives are aligned to the proposal and a measurable outcome is listed for each goal. For example, "Objective 2: Conduct an experiment assessing YLA implementation and impact leads to 2.1. Recruit teachers and schools (AIR). This objective results in Objective 2 measurable outcomes: Recruitment is completed on schedule" (pgs. e29-e30). In addition, the applicant provides a Table detailing which measures will be used for each outcome (Appendix J4. Experimental Outcome Measure Details, p. e116 - e117)

**Weaknesses:**

No weaknesses found.

**Reader's Score: 5**

**3. (3) The extent to which the design of the proposed project is appropriate to, and will successfully address, the needs of the target population or other identified needs. (15 points)**

**Strengths:**

The target population indicated in the proposal meets the benchmark for Absolute Priority 3, Promoting equity in student access to educational resources and opportunities: STEM. For example, Table 2 (p. e31), lists the population of students underrepresented in STEM in the target schools at 68% and 84% respectively. Since the proposed program will be incorporated into required science courses, the target students will have access to the program(s).

**Weaknesses:**

No weaknesses found.

**Reader's Score: 15**

**Selection Criteria - Quality of Project Personnel**

**1. The Secretary considers the quality of the personnel who will carry out the proposed project. In determining the quality of project personnel, the Secretary considers the following factor:**

**Reader's Score: 10**

**Sub**

**1. (1) The extent to which the applicant encourages applications for employment from persons who are members of groups that have traditionally been underrepresented based**

**Sub**

**on race, color, national origin, gender, age, or disability. In addition, the Secretary considers the qualifications, including relevant training and experience, of key project personnel. (10 points)**

**Strengths:**

The proposed staff have extensive research and teaching experience in the STEM field. The Project Director identified for this proposal has previous experience with grants of this scope and is currently the Co-Principal Investigator on 5 year, \$5,000,000,000 contract with another agency. According to the applicant, both the New York Hall of Science and the American Institutes of Research (partners in this proposal), have established hiring and management practices to ensure the recruitment and retention of members of groups that are traditionally underrepresented (pgs. e32-e33).

**Weaknesses:**

No weaknesses found.

**Reader's Score: 10**

**Selection Criteria - Quality of the Management Plan**

**1. The Secretary considers the quality of the management plan for the proposed project. In determining the adequacy of resources and quality of the management plan for the proposed project, the Secretary considers the following factors:**

**Reader's Score: 10**

**Sub**

**1. (1) The adequacy of the management plan to achieve the objectives of the proposed project on time and within budget, including clearly defined responsibilities, timelines, and milestones for accomplishing project tasks.**

**Strengths:**

The applicant provides a list of goals and objectives, that are clearly defined, with responsible partners assigned to each objective. For example, "Objective 4.3. Convene biweekly project director meetings (NSYCI)" and Goal 1: Develop and evaluate YLA Intervention leads to Objective 1: Develop, pilot test and field test YLA units which results in Measurable Outcome: Pilot and field tests are conducted on schedule with 5/6 of participating teachers implementing (p. e30).

**Weaknesses:**

No weaknesses found.

**Reader's Score: 10**

**Priority Questions**

**Competitive Preference Priority - Competitive Preference Priority 1**

**1. Competitive Preference Priority 1:**

**Promoting Equity in Student Access to Educational Resources and Opportunities: Implementers and Partners**

(up to 5 points)

Under this priority, an applicant must demonstrate how the project will be implemented by or in partnership with one or more of the following entities:

- (a) Community colleges (as defined in the NIA)
- (b) Historically Black colleges and universities (as defined in the NIA)
- (c) Tribal Colleges and Universities (as defined in the NIA)
- (d) Minority-serving institutions (as defined in the NIA)

**Strengths:**

Applicant did not address this priority.

**Weaknesses:**

Applicant did not address this priority.

**Reader's Score: 0**

**Competitive Preference Priority - Competitive Preference Priority 2**

**1. Competitive Preference Priority 2:**

**Supporting a Diverse Educator Workforce and Professional Growth to Strengthen Student Learning  
(up to 2 points)**

Projects that are designed to increase the proportion of well-prepared, diverse, and effective educators serving students, with a focus on underserved students, through building or expanding high-poverty school districts' capacity to hire, support, and retain an effective and diverse educator workforce, through adopting or expanding comprehensive, strategic career and compensation systems that provide competitive compensation and include opportunities for educators to serve as mentors and instructional coaches, or to take on additional leadership roles and responsibilities for which educators are compensated.

**Strengths:**

Applicant did not address this priority.

**Weaknesses:**

Applicant did not address this priority.

**Reader's Score: 0**

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**Status:** Submitted  
**Last Updated:** 09/15/2023 03:46 PM

Status: Submitted

Last Updated: 09/15/2023 01:03 PM

## Technical Review Coversheet

Applicant: New York Hall of Science (S411C230141)

Reader #2: \*\*\*\*\*

	Points Possible	Points Scored
<b>Questions</b>		
<b>Selection Criteria</b>		
<b>Significance</b>		
1. Significance	20	20
<b>Quality of Project Design</b>		
1. Project Design	30	26
<b>Quality of Project Personnel</b>		
1. Project Personnel	10	10
<b>Quality of the Management Plan</b>		
1. Management Plan	10	10
<b>Sub Total</b>	70	66
<b>Priority Questions</b>		
<b>Competitive Preference Priority</b>		
<b>Competitive Preference Priority 1</b>		
1. Promoting Equity	5	0
<b>Competitive Preference Priority 2</b>		
1. Workforce Diversity	2	0
<b>Sub Total</b>	7	0
<b>Total</b>	77	66

# Technical Review Form

Panel #10 - EIR Early-Phase - 10: 84.411C

Reader #2: \*\*\*\*\*

Applicant: New York Hall of Science (S411C230141)

## Questions

### Selection Criteria - Significance

1. The Secretary considers the significance of the proposed project. In determining the significance of the proposed project, the Secretary considers the following factor:

Reader's Score: 20

#### Sub

1. (1) The extent to which the proposed project involves the development or demonstration of promising new strategies that build on, or are alternatives to, existing strategies. (20 points)

#### Strengths:

The significance of the proposed project is to improve science achievement in middle grades and focus on high-need students who are underrepresented in STEM career pathways. Using Your Light and AIR (YLA), will introduce students to the practices of civic scientific investigations and provide ongoing professional development. (e21) This project has lessons that are congruent with the middle school curriculum in terms of scientific investigation mastery. For example, assessing the accuracy of the data and methods analyzing the data to consider implications and using it to support explanations and design solutions are very important. (e26)

#### Weaknesses:

No weaknesses noted.

Reader's Score: 20

### Selection Criteria - Quality of Project Design

1. The Secretary considers the quality of the design of the proposed project. In determining the quality of the design of the proposed project, the Secretary considers the following factors:

Reader's Score: 26

#### Sub

1. (1) The extent to which there is a conceptual framework underlying the proposed research or demonstration activities and the quality of that framework. (10 points)

**Sub**

**Strengths:**

The conceptual framework is to provide guidance on how to conduct scientific investigations in local classrooms of students who are high need and underrepresented in the Science, Technology, Engineering, and Math (STEM) career pathways. These have been taken from Next Generation Science Standards, New York State standards, and Skyline curriculum to 1) Develop questions about the local classroom environment that can be solved through investigation; 2) Design the investigation, 3) Conduct the investigation; 4) Assess the accuracy of the data and methods; 5) Analyze data and consider implications 6) Use the data as evidence to support explanations or design solutions. (e26) This project also will focus on professional development to ensure that instructional practices can be impactful. This will use the scale immersion model for professional learning (SIMPL) in which teachers will experience the curricula practice themselves and then reflect. (e27)

**Weaknesses:**

No weaknesses noted.

**Reader's Score: 10**

**2. (2) The extent to which the goals, objectives, and outcomes to be achieved by the proposed project are clearly specified and measurable. (5 points)**

**Strengths:**

The goals of the proposed project are 1) to develop and evaluate the Your Light and AIR (YLA) intervention, and 2) maximize the impact of the project by sharing its findings broadly and managing the project responsibly and they each have specific objectives(e29) For example: Goal 2 is to maximize the impact of the project by sharing its findings broadly and managing the project responsibly. It is outlined via objectives 3.1-3.4 which notes how this is to be completed. (e30)

**Weaknesses:**

A goal for early intervention for performance, a main priority for this project , is not measured. Further, there is no clear rationale for the first goal of developing and implementing Your Light and AIR (YLA.) For example, objective 1 is to develop and test the pilot in which the measurable outcome is for  $\frac{2}{3}$  of teachers recruited to stay with the project. Due to the necessity of teacher feedback for modifications and subsequent implementation cycles, this could result in the project lacking sufficient support and information to be redesigned and enhanced. (e29)

**Reader's Score: 1**

**3. (3) The extent to which the design of the proposed project is appropriate to, and will successfully address, the needs of the target population or other identified needs. (15 points)**

**Strengths:**

This proposed project appropriately works to embed the Your Light and AIR (YLA) curriculum for further understanding of the scientific inquiry cycle. This important push for scientific investigations can lead to Science, Technology, Engineering, and Math (STEM) career pathways for underrepresented students. The project will directly target students residing in low-income communities and attending under-resourced schools. (e22) Table 1 shows the demographic characteristics of students that will be target schools for this project. (e31)

**Weaknesses:**

No weaknesses noted.

**Reader's Score: 15**

## Selection Criteria - Quality of Project Personnel

1. The Secretary considers the quality of the personnel who will carry out the proposed project. In determining the quality of project personnel, the Secretary considers the following factor:

Reader's Score: 10

### Sub

1. (1) The extent to which the applicant encourages applications for employment from persons who are members of groups that have traditionally been underrepresented based on race, color, national origin, gender, age, or disability. In addition, the Secretary considers the qualifications, including relevant training and experience, of key project personnel. (10 points)

#### Strengths:

This applicant is an Equal Opportunity Employer (EOE) and ensures recruitment through diverse networks. There also have been significant changes to have consistency and transparency in job titles with equitable compensation. Currently, there are processes for review and opportunities for advancement that are equitable and inclusive for all staff. (e32). American Institutes for Research (AIR) is committed to a diverse work environment and encourages minorities, women, individuals with disabilities, and veterans to apply. The project director ins an expert in standards-based science teacher professional development and environmental education(e34)

#### Weaknesses:

No weaknesses noted

Reader's Score: 10

## Selection Criteria - Quality of the Management Plan

1. The Secretary considers the quality of the management plan for the proposed project. In determining the adequacy of resources and quality of the management plan for the proposed project, the Secretary considers the following factors:

Reader's Score: 10

### Sub

1. (1) The adequacy of the management plan to achieve the objectives of the proposed project on time and within budget, including clearly defined responsibilities, timelines, and milestones for accomplishing project tasks.

#### Strengths:

A very detailed management plan for the proposed project is outlined in Appendix J6 and J7(e119-126). In order to make sure the project is meeting deadlines on the provided timeline, the project director and co-director will hold monthly meetings to monitor progress, make recommendations, and make adjustments. They will also meet bi-weekly along with the evaluation team and research and development teams. In Exhibit 1, the research questions and data source for the evaluation of Your Light and Air (YLA )will use a variety of data sources to assess impact and implementation such as Next Generation Science Standards (NGSS) assessment, state science assessments, surveys for teachers and students, etc. (e37)

Sub

**Weaknesses:**

No weaknesses noted.

**Reader's Score: 10**

**Priority Questions**

**Competitive Preference Priority - Competitive Preference Priority 1**

**1. Competitive Preference Priority 1:**

**Promoting Equity in Student Access to Educational Resources and Opportunities: Implementers and Partners  
(up to 5 points)**

Under this priority, an applicant must demonstrate how the project will be implemented by or in partnership with one or more of the following entities:

- (a) Community colleges (as defined in the NIA)
- (b) Historically Black colleges and universities (as defined in the NIA)
- (c) Tribal Colleges and Universities (as defined in the NIA)
- (d) Minority-serving institutions (as defined in the NIA)

**Strengths:**

The applicant did not address this priority.

**Weaknesses:**

The applicant did not address this priority.

**Reader's Score: 0**

**Competitive Preference Priority - Competitive Preference Priority 2**

**1. Competitive Preference Priority 2:**

**Supporting a Diverse Educator Workforce and Professional Growth to Strengthen Student Learning  
(up to 2 points)**

Projects that are designed to increase the proportion of well-prepared, diverse, and effective educators serving students, with a focus on underserved students, through building or expanding high-poverty school districts' capacity to hire, support, and retain an effective and diverse educator workforce, through adopting or expanding comprehensive, strategic career and compensation systems that provide competitive compensation and include opportunities for educators to serve as mentors and instructional coaches, or to take on additional leadership roles and responsibilities for which educators are compensated.

**Strengths:**

The applicant did not address this priority.

**Weaknesses:**

The applicant did not address this priority.

**Reader's Score:** 0

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**Status:** Submitted

**Last Updated:** 09/15/2023 01:03 PM

Status: Submitted

Last Updated: 09/15/2023 10:17 AM

## Technical Review Coversheet

Applicant: New York Hall of Science (S411C230141)

Reader #3: \*\*\*\*\*

	Points Possible	Points Scored
<b>Questions</b>		
<b>Selection Criteria</b>		
<b>Significance</b>		
1. Significance	20	16
<b>Quality of Project Design</b>		
1. Project Design	30	26
<b>Quality of Project Personnel</b>		
1. Project Personnel	10	10
<b>Quality of the Management Plan</b>		
1. Management Plan	10	10
<b>Sub Total</b>	70	62
<b>Priority Questions</b>		
<b>Competitive Preference Priority</b>		
<b>Competitive Preference Priority 1</b>		
1. Promoting Equity	5	0
<b>Competitive Preference Priority 2</b>		
1. Workforce Diversity	2	0
<b>Sub Total</b>	7	0
<b>Total</b>	77	62

# Technical Review Form

Panel #10 - EIR Early-Phase - 10: 84.411C

Reader #3: \*\*\*\*\*

Applicant: New York Hall of Science (S411C230141)

## Questions

### Selection Criteria - Significance

1. The Secretary considers the significance of the proposed project. In determining the significance of the proposed project, the Secretary considers the following factor:

Reader's Score: 16

#### Sub

1. (1) The extent to which the proposed project involves the development or demonstration of promising new strategies that build on, or are alternatives to, existing strategies. (20 points)

#### Strengths:

This project builds upon scientific investigations conducted during the sixth to eighth grades, as it acquaints students with the concept of civic scientific investigation. Civic scientific investigation entails an exploratory approach that encourages learners to utilize their curiosity and existing knowledge to explore and improve the circumstances of their day-to-day surroundings. (e21)

Additionally, this grant will offer ongoing professional development aimed at changing classroom culture conducive to the effective execution of high-quality science learning opportunities. It will also involve the modification of implementation plans for other investigations within their existing curriculum. (e22)

#### Weaknesses:

The reasons for the absence of a culture conducive to the effective execution of high-quality science learning opportunities in under-resourced schools remain ambiguous. For instance, the applicant does not provide any data to support the claim that thermometers are insufficient for scientific research. (e23)

Reader's Score: 16

### Selection Criteria - Quality of Project Design

1. The Secretary considers the quality of the design of the proposed project. In determining the quality of the design of the proposed project, the Secretary considers the following factors:

**Reader's Score: 26**

**Sub**

- 1. (1) The extent to which there is a conceptual framework underlying the proposed research or demonstration activities and the quality of that framework. (10 points)**

**Strengths:**

The applicants' professional development will draw on the Scale Immersion Model for Professional Learning. This model is an iterative learning process in which teachers first experience the light and air units and investigation practices as learners, carrying out the complete investigations themselves, and then reflect on the experience as educators. (e27)

The applicant will be utilizing the Scale Immersion Model for Professional Learning, which employs an iterative learning method. In this approach, teachers start by participating in classroom investigation practices as learners. They then personally carry out complete investigations and subsequently contemplate their encounters from an educational perspective. (e25)

**Weaknesses:**

No weaknesses noted.

**Reader's Score: 10**

- 2. (2) The extent to which the goals, objectives, and outcomes to be achieved by the proposed project are clearly specified and measurable. (5 points)**

**Strengths:**

The applicant outlined quantifiable goals and objectives for teacher professional development. For example, the applicant mentions that two-thirds of the teachers engaged in implementation design cycles are expected to remain committed throughout their research and development cycles. (e29)

**Weaknesses:**

The applicant's submission lacks details on how they intend to assess the achievement of student learning outcomes. For example, they did not go into detail regarding the technique used to assess how well students will comprehend the significance, objectives, and methods of scientific investigation. Additionally, there is a lack of clarity concerning the approach to measuring classroom culture. (e29)

**Reader's Score: 1**

- 3. (3) The extent to which the design of the proposed project is appropriate to, and will successfully address, the needs of the target population or other identified needs. (15 points)**

**Strengths:**

The project is aimed at students living in economically disadvantaged neighborhoods and enrolled in schools with limited resources. These students are more likely to have attended elementary schools that provided restricted opportunities for high-quality science learning experiences.(e31)

**Weaknesses:**

No weaknesses noted.

**Reader's Score: 15**

## Selection Criteria - Quality of Project Personnel

1. The Secretary considers the quality of the personnel who will carry out the proposed project. In determining the quality of project personnel, the Secretary considers the following factor:

Reader's Score: 10

### Sub

1. (1) The extent to which the applicant encourages applications for employment from persons who are members of groups that have traditionally been underrepresented based on race, color, national origin, gender, age, or disability. In addition, the Secretary considers the qualifications, including relevant training and experience, of key project personnel. (10 points)

#### Strengths:

The New York Hall of Science and American Institutes for Research actively promote job applications from individuals who belong to groups that have historically been underrepresented. They achieve this by implementing standardized procedures for hiring, which ensure recruitment through diverse networks, maintain uniform interviewing practices, and employ objective rating systems. (e162)

The key personnel possess pertinent training and expertise to effectively execute this grant. To illustrate, the Lead Staff member has experience in both standards-based science teacher professional development and environmental education. (e33)

#### Weaknesses:

No weaknesses noted.

Reader's Score: 10

## Selection Criteria - Quality of the Management Plan

1. The Secretary considers the quality of the management plan for the proposed project. In determining the adequacy of resources and quality of the management plan for the proposed project, the Secretary considers the following factors:

Reader's Score: 10

### Sub

1. (1) The adequacy of the management plan to achieve the objectives of the proposed project on time and within budget, including clearly defined responsibilities, timelines, and milestones for accomplishing project tasks.

#### Strengths:

The applicant outlined general responsibilities for executing this grant. To illustrate this, the New York Hall of Science will take charge of steering and supervising all program activities, handling partner and advisor communications, and spearheading both curricular development and professional development initiatives. (e35)

The applicant furnished a broad timeline for grant implementation. For instance, advisors will convene with project

**Sub**

staff on an annual basis to facilitate planning, offer feedback, and contribute to the formulation of mid-course adjustments. (e126)

**Weaknesses:**

No weaknesses noted.

**Reader's Score: 10**

**Priority Questions**

**Competitive Preference Priority - Competitive Preference Priority 1**

**1. Competitive Preference Priority 1:**

**Promoting Equity in Student Access to Educational Resources and Opportunities: Implementers and Partners (up to 5 points)**

Under this priority, an applicant must demonstrate how the project will be implemented by or in partnership with one or more of the following entities:

- (a) Community colleges (as defined in the NIA)
- (b) Historically Black colleges and universities (as defined in the NIA)
- (c) Tribal Colleges and Universities (as defined in the NIA)
- (d) Minority-serving institutions (as defined in the NIA)

**Strengths:**

The applicant did not address.

**Weaknesses:**

The applicant did not address.

**Reader's Score: 0**

**Competitive Preference Priority - Competitive Preference Priority 2**

**1. Competitive Preference Priority 2:**

**Supporting a Diverse Educator Workforce and Professional Growth to Strengthen Student Learning (up to 2 points)**

Projects that are designed to increase the proportion of well-prepared, diverse, and effective educators serving students, with a focus on underserved students, through building or expanding high-poverty school districts' capacity to hire, support, and retain an effective and diverse educator workforce, through adopting or expanding comprehensive, strategic career and compensation systems that provide competitive compensation and include opportunities for educators to serve as mentors and instructional coaches, or to take on additional leadership roles and responsibilities for which educators are compensated.

**Strengths:**

Did not address.

**Weaknesses:**

Did not address.

**Reader's Score:**     **0**

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**Status:**             Submitted

**Last Updated:**    09/15/2023 10:17 AM

Status: Submitted

Last Updated: 09/28/2023 10:47 AM

## Technical Review Coversheet

**Applicant:** New York Hall of Science (S411C230141)

**Reader #1:** \*\*\*\*\*

	Points Possible	Points Scored
<b>Questions</b>		
<b>Selection Criteria</b>		
<b>Quality of the Project Evaluation</b>		
1. Project Evaluation	30	30
<b>Sub Total</b>	30	30
<b>Total</b>	30	30

# Technical Review Form

Panel #8 - Early-phase Tier II Panel - 8: 84.411C

Reader #1: \*\*\*\*\*

Applicant: New York Hall of Science (S411C230141)

## Questions

### Selection Criteria - Quality of the Project Evaluation

1. The Secretary considers the quality of the evaluation to be conducted of the proposed project. In determining the quality of the evaluation, the Secretary considers the following factors:

Reader's Score: 30

#### Sub

1. (1) The extent to which the methods of evaluation will, if well implemented, produce evidence about the project's effectiveness that would meet the What Works Clearinghouse standards with or without reservations as described in the What Works Clearinghouse Handbook (as defined in this notice). (20 points)

#### Strengths:

The applicant presents an excellent evaluation design that is likely to meet What Works Clearinghouse (WWC) standards without reservations if implemented as proposed. Forty-four schools within two school districts (Chicago Public Schools and New York City Geographical District) will participate in a school-level randomized trial (e38), in which schools are randomized to condition within each school district. A total of 132 grades 6-8 teachers and their 11,660 middle school students are expected to participate in the project providing a large sample of teachers and students (e39). The applicant justifies that this sample is sufficient for estimating the effectiveness of the treatment by presenting a detailed summary of the power analyses and the related minimum detectable effect sizes (MDES) (e109). Prior to any potential attrition, the proposed sample yields an MDES of .22 for student level outcomes and .40 for teacher outcomes (e39). All the proposed outcome measures are supported with reliability statistics and are consistent with the target constructs being evaluated without being over aligned. Several strategies will be used to minimize attrition to the extent possible, including conducting random assignments at the beginning of the school year and providing incentives to study participants (e143), as well as conducting the study within one school year. However, should attrition levels be determined to be too high, the study team will implement procedures to change the evaluation to a quasi-experimental design that will meet WWC standards with reservations (e114). The evaluation team will also consider the risk related to students joining the study after randomization, and if there is risk of bias, students joining the study schools will not be included in the impact analyses, which is consistent with WWC standards (e39). The statistical models are clear and comprehensive, including controlling for baseline outcome measures (e110-e112). Appropriate strategies are discussed for handling missing data and different strategies will be considered and implemented depending on the extent of missing data (for example, multiple imputation versus listwise deletion) (e114). The applicant identifies an independent evaluation team with experience in conducting large randomized controlled trials, which provides confidence that the evaluation will likely meet WWC standards without reservations (e33).

#### Weaknesses:

No weaknesses noted.

Sub

Reader's Score: 20

2. (2) The extent to which the methods of evaluation will provide performance feedback and permit periodic assessment of progress toward achieving intended outcomes. (5 points)

**Strengths:**

The applicant presents excellent strategies to ensure that performance feedback is collected and that there are ongoing mechanisms for permitting a periodic assessment of progress toward achieving the intended outcomes. For example, the applicant proposes a pilot study and then a feedback study of the treatment using a design-based research process that will allow performance feedback to be collected and addressed prior to the impact study (e27, e35). There will be a formal system in place to provide periodic assessments of progress. This system will include weekly meetings with the project team to share and reflect on feedback and bi-weekly leadership meetings (e35-e36). The applicant presents multiple measures that will be used to evaluate implementation fidelity, including teacher participation metrics, teacher lesson logs, teacher interviews, and focus group interviews with teachers and students (e43). Their design allows for the project to iteratively improve between implementation phases using multiple measures collected at multiple time points. The applicant clearly discusses how the various qualitative data will be analyzed systematically (e118) and used in conjunction with the quantitative data (e44), which is important in mixed-methods studies.

**Weaknesses:**

No weaknesses noted.

Reader's Score: 5

3. (3) The extent to which the evaluation plan clearly articulates the key project components, mediators, and outcomes, as well as a measurable threshold for acceptable implementation. (5 points)

**Strengths:**

The applicant presents an evaluation plan that clearly articulates the key project components, mediators, and outcomes, and sets measurable thresholds for acceptable implementation for the key components (e45, e99). For example, the key project components include teacher training, teacher implementation of units and lesson plans, and student participation in these lessons, with outcomes related to improved teacher practices and student achievement, civic efficacy, and beliefs about the social benefits of science. The evaluation is aligned to this conceptual framework and will be guided by related confirmatory, exploratory, and implementation research questions (e37). Each key component has an aligned threshold. For example, teachers must participate in 80 percent of the workshops, teacher 80 percent of the unit lessons, and students must complete 75 percent of the lesson (e45) to meet fidelity of implementation thresholds. The applicant includes both moderation and mediation research questions in the evaluation framework and demonstrates how these analyses will be conducted using accepted practices (e37). Specifically, the applicant proposes a valid use of multilevel path analyses to test whether student outcomes are mediated by teacher outcomes, student engagement, and students' curiosity and interest (e113). Moderation analyses will determine the extent to which the impacts of the treatment are moderated by student, teacher, and school characteristics by adding interaction terms to the hierarchical linear models (e112).

**Weaknesses:**

No weaknesses noted.

Reader's Score: 5

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**Status:** Submitted

**Last Updated:** 09/28/2023 10:47 AM



Status: Submitted

Last Updated: 09/29/2023 09:18 AM

## Technical Review Coversheet

**Applicant:** New York Hall of Science (S411C230141)

**Reader #2:** \*\*\*\*\*

	Points Possible	Points Scored
<b>Questions</b>		
<b>Selection Criteria</b>		
<b>Quality of the Project Evaluation</b>		
1. Project Evaluation	30	30
<b>Sub Total</b>	30	30
<b>Total</b>	30	30

# Technical Review Form

Panel #8 - Early-phase Tier II Panel - 8: 84.411C

Reader #2: \*\*\*\*\*

Applicant: New York Hall of Science (S411C230141)

## Questions

### Selection Criteria - Quality of the Project Evaluation

1. The Secretary considers the quality of the evaluation to be conducted of the proposed project. In determining the quality of the evaluation, the Secretary considers the following factors:

Reader's Score: 30

#### Sub

1. (1) The extent to which the methods of evaluation will, if well implemented, produce evidence about the project's effectiveness that would meet the What Works Clearinghouse standards with or without reservations as described in the What Works Clearinghouse Handbook (as defined in this notice). (20 points)

#### Strengths:

The impact study will entail a school-level randomized controlled trial (RCT) with blocking at the district-level among 44 schools with grades 6-8 across two large, urban school districts (e38). Key outcomes for the impact analysis include state standardized science assessments and science course grades (e37). Other key outcomes for the impact analysis include student and teacher surveys using established measures, most of which have evidence of strong reliability (e41). The evaluation plan takes several steps to mitigate risk of bias due to attrition such as providing incentives for assistance with data collection and coordinating follow-ups (e39). The risk of contamination or bias due to joiners will be minimized by school-level assignment and not publicly disclosing information about participating in or school condition for the impact study (e39). Nonetheless, there are also plans to compute overall and differential attrition and test for baseline equivalence at the school, teacher, and student levels (e39, e114). In addition, there are plans to manage high or differential attrition and more than 5% of missing data via methods such as using an acceptable missing data strategy like multiple imputation or matching schools and students (e114). The application conducts a thorough power analysis that is appropriate with parameters that are well-grounded in research literature (e109). The evaluation team plans to travel to sites and provide incentives for recruitment.

Overall, the impact study is very rigorous, well planned, and if well executed likely would meet WWC standards without reservations.

#### Weaknesses:

No weaknesses noted.

Reader's Score: 20

2. (2) The extent to which the methods of evaluation will provide performance feedback and permit periodic assessment of progress toward achieving intended outcomes. (5 points)

**Sub**

**Strengths:**

The methods of evaluation include very thorough plans for gathering and analyzing (e43-e44) a comprehensive set of relevant data. This includes, for example, teacher’s participation in professional development (PD), teacher weekly online log entries about usability of program, and teacher and student focus groups (e43). During the development years, the evaluation team will share results in monthly meetings during summer and bimonthly during the school year (e43). The application nicely ties providing implementation data for performance feedback and progress assessment meetings (via monthly meetings in summer and bi-monthly meetings in the school year) to implementation research questions (e42-e43).

The very thorough evaluation data and plans are well aligned to the project outcomes and research questions. These will likely be very useful in providing performance feedback and permit periodic assessment of progress toward achieving intended outcomes.

**Weaknesses:**

No weaknesses noted.

**Reader's Score: 5**

**3. (3) The extent to which the evaluation plan clearly articulates the key project components, mediators, and outcomes, as well as a measurable threshold for acceptable implementation. (5 points)**

**Strengths:**

Implementation thresholds are clearly outlined and these may be refined as needed during research and development cycles (e44-e45). The application includes a thorough logic model that specifies the key project components (teacher PD and instructional units), mediators (teachers’ use of NGSS practices, self-efficacy, and support for students’ civic engagement in science), and outcomes (student science achievement, civic efficacy, and beliefs in societal benefits of science; e44-45, e99).

The logic model is well articulated and aligned to the evaluation plan. Thresholds for acceptable implementation are also very clearly and thoroughly articulated.

**Weaknesses:**

No weaknesses noted

**Reader's Score: 5**

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