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Resilient Schools Consortium (RiSC) Phase II

Summative Evaluation Report

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Executive Summary

In 2017, Brooklyn College, the National Wildlife Federation (NWF), and several New York–based partner organizations launched the Resilient Schools Consortium (RiSC). Funded by both the Federal Emergency Management Agency (FEMA) and the National Oceanic and Atmospheric Administration's (NOAA) Environmental Literacy Program (ELP; Grant Award #NA20SEC0080005), the consortium's goals are to deepen middle– and high–school students' understanding of climate change and to empower them to participate in climate resiliency efforts within their communities. Through a partnership with eight New York City public schools, the consortium (which has been led by the New York City chapter of NWF since 2019) works to craft curricula that help students understand and combat the inequitable ecological and social impacts of climate change within Coney Island—a coastal community projected to experience permanent flooding by 2080 (Maldonado & Pierre-Louis, 2022).

Knology has served as RiSC's external evaluator for this phase of the project since 2020. Our evaluation has centered on three questions:

1. Did the curriculum enhance teachers' ability to educate students about the scientific, ecological, and social aspects of climate change?;
2. Did students become more knowledgeable about climate change, and did the curriculum motivate them to become more involved in climate resiliency efforts within the broader Coney Island community?; *and*
3. Did the process of developing and implementing the curriculum strengthen ties between teachers and community partners?

To answer these questions, in Year 3 of the program, we conducted in–depth interviews with teachers and community partners, while also reviewing samples of publicly available student work.

Analysis of this data shows that RiSC is an effective program—one that can help current and future generations acquire the knowledge, skills, and tools needed to improve climate resiliency within their communities. Conversations with teachers and community partners showed that RiSC improved their knowledge of a variety of different climate–related topics, gave them useful strategies and resources for promoting awareness of climate change and its local impacts, and showed them how to help students contribute to climate action efforts. Our review of students' work confirmed that the program gave them a more in–depth understanding of the scientific, environmental, and social dimensions of climate change, while also equipping them with the knowledge needed for effective civic engagement. Beyond this, the program facilitated growth in students' critical thinking, problem solving, public speaking, and leadership skills. As in previous years, teachers and community partners agreed that RiSC had furthered students' commitments to climate justice, and that the curriculum offers a model that can be implemented in any part of the country confronting climate–related risks and threats.

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Introduction

The Resilient Schools Consortium (RiSC) is an educational program that seeks to advance middle– and high–school students' understanding of climate change and to empower them to participate in climate resiliency efforts within their communities. Launched in schools in 2017 by Brooklyn College, the National Wildlife Federation (NWF), and several New York–based community organizations, RiSC is supported by funding from the Federal Emergency Management Agency (FEMA) and the National Oceanic and Atmospheric Administration (NOAA). Since 2020, Phase II of the RiSC program has been funded by a NOAA Environmental Literacy Program (ELP) grant (award #NA20SEC0080005) and by Cooperating Technical Partners grants from the Federal Emergency Management Agency (FEMA), and has been led by the NWF's New York City field office. Through a partnership with New York City public schools, community partners, and educational partners, the consortium implemented a curriculum to help students understand and combat the inequitable ecological and social impacts of climate change within one of New York's most vulnerable communities: Coney Island.

As with many other coastal areas, climate change is predicted to cause significant erosion and sea level rise within Coney Island. Some of these impacts are already visible. In 2012, Superstorm Sandy battered homes, businesses, and neighborhoods across the area, and more than a decade later, Coney Island's residents are still recovering from this damage—just as other harmful meteorological events become more intense and frequent on account of climate change (Javed, 2021). Flood maps released in 2022 by the NYC Department of Environmental Protection indicate that at projected sea rise levels, Coney Island is currently in danger of moderate storm water flooding; by 2080, the area is projected to be largely underwater during high tide. These risks threaten not only the region's diverse flora and fauna, but also its people—many of whom belong to historically and persistently excluded groups. Census data indicate that roughly four in 10 Coney Island inhabitants identify as BIPOC, and as of 2020, the median household income within the area was $41,347—approximately 60% of the median household income for all of New York City (US Census Bureau, 2020).

Addressing all of these interrelated phenomena, RiSC imparts a broad–based understanding of climate change, drawing attention to it as a multidimensional problem that is ecological, scientific, social, economic, and political. As they develop a place–based, hyper–local awareness of climate change, RiSC students come to see how local policies (including the controversial Coney Island NYC Ferry Project) and broader socio–historical phenomena such as systemic racism and economic marginalization have contributed to patterns of environmental destruction and ecological precarity across the Coney Island community. Centering climate justice, the RiSC curriculum builds environmental and climate literacy in ways that encourage students to address community needs and increase individual and collective resilience in the face of local threats posed by climate change. To promote civic engagement, RiSC works with the Coney Island Beautification Project, the New York Sea

Grant's Brooklyn College–based team, and the Northeast chapter of The American Littoral Society—all of whom support the in–school curriculum development process by arranging field trips to Coney Island Creek and surrounding areas. NWF also contracted with Kid Power Academy to provide public speaking training twice a year to RiSC clubs.

During Year 2 and Year 3 of the project, teachers at RiSC schools and project partners worked together to implement the curriculum, which revolved around three key projects:

- ***Climate Action Project 1: Coney Island Past, Present, Future*** — RiSC teams created a public display (physical or virtual) for their school community showing Coney Island in different periods of its ecological and social history. The displays also highlighted some of the current and future impacts of climate change.
- ***Climate Action Project 2: Coney Island Oral History Podcasts*** — RiSC teams created a podcast to capture and amplify the voices of Coney Island residents. The goals of this project were to better understand the strengths and needs of the community and to develop plans for making Coney Island more resilient to climate change.
- ***Climate Action Project 3: Community Open House*** — RiSC teams organized an Open House with and for the residents of Coney Island to plan for a more resilient coastal community and share their learning from Projects 1 & 2. Students who participated in this event displayed the results of an activity called "Postcards from the Future," in which they were asked to imagine themselves living in the year 2080 (by which date Coney Island is expected to face permanent flood risks) and write to their present selves (or to friends and/or relatives) from the perspective of their future selves.

Evaluation

Since Phase II of the project started in Fall 2020, Knology has served as the program's external evaluator. Through a combination of in–depth interviews with teachers and community partners, reviews of publicly presented student work, and participation in partnership building activities, we have gathered data speaking to both the design and implementation of the RiSC curriculum. In analyzing this data, our goal has been to determine the extent to which RiSC is promoting environmental literacy, climate–related civic engagement, and social resilience in vulnerable communities. Three questions have guided our assessment of RiSC:

1. Is the curriculum enhancing teachers' ability to educate students about the scientific, ecological, and social aspects of climate change?;
2. Are students becoming more knowledgeable about climate change, and did the curriculum motivate them to become more involved in climate resiliency efforts within the broader Coney Island community?; *and*
3. Is the process of developing and implementing the curriculum strengthening ties between teachers and community partners?

Our evaluation is aligned with and informed by each of the six causal pathways identified in the NOAA ELP Community Resilience Education Theory of Change (Bey et al., 2020).

Project History

Year 1

Year 1 activities took place between October 2020 and September 2021, and they focused on program planning and curriculum development. During a series of six virtual working sessions, NWF collaborated with teachers, school leaders, and community partners to design the RiSC Phase II curriculum. Knology attended these meetings, offering feedback on assessment tools and supporting relationship–building within the consortium.

Our observations of these sessions revealed that project partners had successfully created a multidisciplinary network, one with both a deep knowledge of the Coney Island community and a deep commitment to improving local residents' quality of life by advocating for environmental, economic, and social justice. While creating a space for community partners to share their fears and stories about the various climate impacts they had lived through and witnessed, these planning sessions engendered a strong belief in the community's ability to overcome present and future environmental challenges. Participants were especially excited about the project's prospects for empowering students to become active change agents in their communities, and they believed that by participating in public–facing projects, students could help improve ecological, social, and economic conditions across Coney Island.

Year 2

Year 2 activities took place between October 2021 and September 2022. During this period, seven New York City Department of Education (DOE) public schools were brought into the consortium to implement the curriculum developed in Year 1, which included both in–class or afterschool activities and a series of off–campus events. Eight teachers and six community partners supported these efforts, and within each of the seven schools, participating students became members of a RiSC team.

To assess the impact of these initiatives, at two points during Year 2, we interviewed RiSC teachers and community partners. Interviews lasted between 30 and 45 minutes and sought to determine the following:

- Teacher efficacy and confidence in teaching climate change topics—including the inequitable impacts, social vulnerabilities, and emotional aspects related to climate change;
- Partnership–building within the Coney Island community and RiSC program, including teachers and students;
- Student science–learning, understanding of resilience and climate literacy, skill–building, and civic engagement; *and*
- Curriculum development process between teachers and community partners.

Our Year 2 evaluation activities also included an analysis of student work produced through a project called "Postcards from the Future."

The results of our Year 2 evaluation (Field et al., 2022) indicated that the implementation of the RiSC curriculum was a success, yielding multiple benefits for both teachers and students. Participating teachers were incredibly enthusiastic about the curriculum, and they appreciated how the collaborative nature of its design allowed them to work with and learn

from individuals with expertise in many different fields. They found that this process not only deepened their own knowledge of climate change, but also gave them the ability to take a multidisciplinary approach to their teaching. While many were comfortable teaching the science of climate change, RiSC equipped them with the resources, tools, and confidence to connect climate science to environmental justice concerns, historical practices like redlining, and contemporary social problems such as economic inequality. They appreciated that the curriculum approached these topics in an empowering, hopeful, and optimistic manner, and felt prepared to offer guidance to any students in need of psychological and emotional support.

Our evaluation also found that RiSC advanced students' knowledge of climate change and furthered their commitments to environmental justice work. Teachers reported that their response to the curriculum was mostly positive. In addition to facilitating understanding of climate change's scientific, environmental, and social dimensions, RiSC promoted critical thinking around the intersections between climate change, economic disparities, and historical practices such as redlining. Particularly effective in this regard were the project's field trips, which helped students make connections between these phenomena and allowed them to witness firsthand the effects of climate change in their own communities. Incredibly empowering, these out–of–class activities increased students' willingness to engage in climate actions and prevented the onset of a *"doom and gloom"* mentality some teachers feared. They also prompted growth in students' leadership, organization, and public speaking skills and helped them realize that there are many ways to do science—and to pursue scientific livelihoods aimed at addressing social problems.

At the conclusion of Year 2, both teachers and community partners were convinced that the RiSC project showed great promise for communities outside of Coney Island. At the same time, project participants also identified areas for improvement. After reviewing their feedback, our Year 2 evaluation included three recommendations for furthering progress toward RiSC's general goals:

1. Opening new channels of communication to give project partners more opportunities for easily and freely discussing matters pertaining to the curriculum and its implementation;
2. Increasing the adaptability of the curriculum to give teachers more flexibility in tailoring it to the needs of particular student groups and to more thoroughly address the intersections between the scientific, social, and economic aspects of climate change; and
3. Creating a plan for promoting student participation in evaluation activities, so their perspectives could be more thoroughly incorporated into official reports.

This Report

This report presents the results of our evaluation of RiSC during Year 3 of the program. Highlighting the experiences and perspectives of both teachers and students, our assessment focuses on four key matters: the design of the RiSC curriculum, the implementation of the curriculum within classrooms and afterschool programs, the process

of partnership building among teachers, community partners, and the NWF team, and RiSC's impacts on students—particularly in terms of knowledge and skills. While the bulk of our analysis centers on Year 3, where appropriate, we also look back to earlier years of the program to point out important continuities and changes over time. This report concludes with a brief discussion that both summarizes our key findings and offers recommendations for future expansion of RiSC or similar programs.

Year 3 Evaluation

Prior to data collection, Knology and the NWF met to discuss adjustments to the interview/focus group script used in Year 2. New questions covered returning teacher and student experiences in the program, and the implementation of the curriculum for ELL students. The script no longer asked about the curriculum design process, as this was covered in Year 2 discussions.

Data collection began in the winter of 2022, after teachers had begun implementing the curriculum. As was the case in Year 2, to accommodate participants' schedules, we opted for individual interviews with teachers and community partners.

Table 1. Number of participants in each round of interviews, Year 3.

Activity	Number of eligible participants	Number spoken with
Initial interviews	14	11*
Close–out interviews	14	9*

Note. *One teacher was accompanied by a colleague during each of the two interviews.

Our initial interviews included discussions with 11 participants. Seven were teachers and four were community partners. In the summer, closing out the evaluation, only nine individuals were available for interviews—seven teachers and two community partners. While we attempted to speak with others, not everyone followed–up or attended the scheduled calls.

In the fall, all of the teachers we interviewed were returning teachers; five taught in high school, and two in middle school. Four ran RiSC in the classroom, while three ran it as an afterschool program.

In addition to interviewing teachers and community partners in Year 3, we also reviewed samples of publicly accessible work students completed through participation in RiSC. Specifically, we analyzed 60 student contributions to the "Postcards from the Future" activity and six podcasts (approximately two hours of audio content) that were publicly distributed as part of the Coney Island History Project's Oral History Archives.

Summative Results

Many of the reflections and observations teachers and community partners shared during summative interviews echoed those made in previous years. As such, some of the findings relayed below confirm and expand on feedback shared in our Year 2 evaluation. Our assessment also points to a number of new findings about RiSC and its impacts—particularly in connection with the experiences of returning teachers and students.

Curriculum Design

Teachers and community partners felt that the curriculum was engaging and full of useful resources and appreciated the place–based nature of its lessons. Though most appropriately geared toward middle schoolers, they found it could be easily adapted for high schoolers. Teachers with special–needs students also found that the curriculum was generally well suited to differentiated learning; the *"big projects were so open ended,"* one teacher said, they gave these students a chance to *"hone in on the skills that they have to make it work for them."* With regard to the curriculum's accessibility, the only criticism we heard pertained to the lack of multilingual resources and materials. One teacher whose classroom included a number of Spanish–speaking students said that by providing access to articles in their native language, the curriculum would have more effectively supported this group of learners. Another teacher said adding materials in Mandarin would have helped their students. Overall, however, teachers thought the curriculum gave them the knowledge and tools needed to facilitate informed conversations with students, and to advance the program's goals.

During interviews, teachers spoke particularly highly of the curriculum's relevance for students' lives. This was true both for students within Coney Island and those living outside the area. Drawing attention to the curriculum's general relatability, two teachers whose classes included a number of English language learners (ELLs) from the Caribbean spoke of how these students *"were able to connect,"* as many of them had *"first–hand experience"* surviving the hurricanes that regularly visit this part of the world. Teachers appreciated how the curriculum's flexibility and adaptability allowed them to speak to their students' varied interests and experiences. However, for schools outside of Coney Island, there was sometimes a disconnect between what was being taught and students' awareness of how Coney Island is being impacted by climate change.

Teachers also appreciated the curriculum's focus on solutions. At the outset of the program, some teachers were worried that discussions of climate change might provoke feelings of stress or anxiety among students. As they became more familiar with the curriculum, however, they appreciated the RiSC model's focus on *"the things that communities can do, and people can do to . . . build resilience."* As one teacher explained:

> *What I love about the RiSC program is . . . the curriculum is designed in a very positive way where it's focused more on . . . what can the students do and what's already being done . . . it's not as negative as sometimes we hear when we're talking about climate change. So, I think that's really good.*

Along with its relevance and positive, solutions–based nature, teachers applauded the curriculum for emphasizing both the social and scientific aspects of climate change. Science teachers were particularly appreciative of this aspect of the curriculum; those who had never before discussed the social components of climate disasters regard this as *"the missing piece"* in their teaching. Others reported that by helping them contextualize the intersections between climate–related harms and social vulnerabilities, the curriculum gave them abundant opportunities for showing students how they could participate in climate action efforts and contribute to finding solutions.

Some teachers and community partners felt the RiSC model could be used in any part of the country subject to the impacts of climate change. While noting that the nature of these impacts will vary by location, they believed that the curriculum's combination of outdoor activities, hands–on, solutions–centered learning, and community engagement makes the RiSC model broadly applicable. In summative interviews, one teacher noted that those administering the curriculum will need to be very familiar with local conditions—including the social and environmental vulnerabilities local residents are facing and the different kinds of community organizations that are active within the area. Due to the current curriculum's hyperlocal focus on Coney Island, a few interviewees recognized that in order to adapt this for other locations, several activities and materials (including examples referenced in slides) would need to be changed.

Curriculum Implementation

Each of the seven teachers we spoke with during summative interviews had previously used the RiSC curriculum during Year 2, and all of them reported feeling much more comfortable with this during Year 3. They felt better prepared, more organized, and more aware of different resources they could use *"at the right times and in the right places."* One teacher said that implementing RiSC was *"a highlight of my career."*

Returning teachers also felt more confident and more knowledgeable with regard to environmental justice topics (such as redlining and other historical inequities that have impacted different communities across New York City) and the scientific and environmental dimensions of climate change. Many developed a more detailed understanding of the concept of resilience. Prior to participating in the program, one interviewee told us that they understood resilience as the ability to *"just tolerate or just survive"* a harmful situation. They often had *"negative"* feelings about climate change, sympathizing with students for the *"ball of crap"* they were experiencing. But after implementing the curriculum, they came to understand resilience *"from a more positive point of view."* Instead of giving students information that would leave them *"completely and utterly defeated,"* they now felt equipped to show them how resilience is about *"grow[ing] and better[ing] ourselves through the changes that are coming."*

Similar changes can be seen on a broader scale as well. During our Year 2 evaluation, some interviewees (including both teachers and community partners) struggled to define this term—as comments such as *"it's kind of a really tough question"* or *"that's a hard question"* indicate. In addition to this, when asked about resilience, some Year 2 respondents focused on the personal dimensions of this concept, linking it to *"the ability to withstand and power through whatever happens."* RiSC helped them see resilience as a communal activity—one

that has both proactive and reactive dimensions. As one interviewee put it, resilience includes measures that both *"minimize the damage"* before climate disasters occur and enable a community to *"recover quickly"* in their aftermath. It is something that *"shows what we could do"* and *"gives hope"* to the community. One interviewee explained that resilience means both acknowledging climate change will happen and showing *"there are steps we can do to combat it."* Resilience sends the message that *"no matter how bad the situation seems,"* there's *"always a way to make an impact."*

Deepening their understanding of resilience as *"building the capacity to overcome the challenges that are associated with the impacts of climate change"* placed teachers in a better position to handle the emotional aspects of teaching about this topic. Highlighting all of this, one teacher shared how

> *I know more about what's going on and how people feel [about the impacts of climate change]. I think it gives me the power to . . . connect with kids because they know that I know the truth, right? That they feel like I'm on their side. They understand . . . I'm not just like some lady who's in their school trying to teach them science . . . I know what's going on. And I can have real conversations with them.*

Returning RiSC teachers also said their continued engagement with the program has helped them make connections between climate change and environmental justice. More teachers emphasized this in summative interviews than they did previously. One teacher who is not from Coney Island talked about how RiSC helped them get to know and engage with the community in meaningful ways. Speaking to how they made use of this knowledge, another teacher shared how highlighting the connections between environmental and social vulnerabilities *"really helped make the science more real in my classroom—and really connected to Coney Island."*

Because they felt more comfortable and confident teaching the curriculum in Year 3, some returning teachers focused on *"revamping"* it. Those outside of Coney Island connected curricular content with situations in their own communities—for example, by comparing sea level rise maps in Coney Island with those for areas where their schools are located. Some teachers modified the examples within individual lessons to make these more applicable to students, at times bringing in their own resources on climate–related topics such as *"food and factory farming."* Along with this, at some schools, teachers infused the curriculum with content from different subjects, making use of colleagues' expertise to create a more holistic approach to learning about climate change. In some cases, the RiSC curriculum was implemented in other classes (such as language arts and history), enabling RiSC students to continue learning about the topics outside of established settings. A few teachers added video, audio, and other multimedia components to the curriculum, encouraging students to take advantage of their tech–savviness when working on projects.

Teachers also modified the curriculum as part of an effort to prevent it from feeling *"a little bit redundant"* for returning students. To avoid repetition in their teaching, many reduced the amount of background information provided to students, allowing them to focus more on project work. They also gave returning students more leadership and authority in groups, sometimes directly asking them how to revise the curriculum. Teachers with special–needs students also made modifications to the curriculum. One teacher broke it down into smaller

chunks and created guided worksheets for some of the lessons. They reported that this provided additional support for their students.

In general, these modifications proved beneficial, although at times, teachers expressed a desire for more support from the NWF team. Some suggested that the curriculum focus more on social media tools, which could be used as an additional way to engage students. Others indicated that more guidance from the NWF team on how to modify the curriculum for returning students would have been helpful. Some suggested that the team plan more field trips for returning students, and one recommended that students be brought into curriculum–planning and development discussions so the NWF team can learn more about what the students care about and how they want to engage with the work.

Along with their selective modifications to the curriculum, teachers continued to adapt it to their situations. Some used it within the classroom and some promoted RiSC as an afterschool program. As was the case in Year 2, some who opted for the latter approach experienced problems with recruitment and retention due to competition with other afterschool programs, and they also reported falling behind on project work on account of insufficient time with students. For some, shifting to in–classroom teaching resolved these issues. One teacher who transitioned to classroom implementation found this more captivating for students, and another added that classroom teaching was more valuable because it allowed them to reach students without a pre–existing interest in the topics covered. But classroom–based approaches also posed certain challenges. Two teachers who used RiSC in the classroom felt constrained in their abilities to implement this in the second half of the school year, as state testing requirements reduced the amount of time they could devote to the program.

In terms of curriculum implementation, the only part of the program felt to be less than totally effective was the Open House in Year 3. A chance for community members, students, and teachers to interact and learn from each other, the Year 3 Open House featured an Indigenous Speaker, and multiple activities including an interactive engagement on sea-level rise. Students received a reusable water bottle and displayed work such as their *Postcards from the Future*. However due to issues outside of RiSC leadership control, such as delivery delays impacting the schedule, one teacher reported that the Year 3 Open House was not as successful of an event as the previous year's. Another said the Year 3 Open House could have been *"a little bit more streamlined,"* noting how at times, students could only stand around and wait—which caused them to disengage. Agreeing with this, two other teachers said their students felt disconnected from the event, and that they *"weren't really part of it as much"* as in Year 2. However, in general, teachers valued the opportunity for their students to engage with other RiSC schools during the Open House and many suggested that the Open House provide more opportunity for student presentation and public speaking, something that was appreciated about the Open House in Year 2.

Relationship Building

Teachers and community partners generally reported positive experiences working with the NWF team. As noted above, at times, they would have appreciated more assistance implementing different parts of the curriculum. For example, in summative interviews, one teacher indicated that receiving more support when attempting to make connections with

community members in Coney Island would have been helpful, as this would have given students more opportunities for their podcasts. Another teacher felt certain aspects of the program were disorganized and reported having to fund some activities and supplies on their *"own dime."* Importantly, this practice of self-funding should not be taken as evidence of project leaders' unwillingness or inability to provide supplies for RiSC activities; indeed, leaders had funds for such supplies and were ready to make them available upon request. Unfortunately, no teachers expressed a need for these materials, which is a reflection of the fact that teachers often self-fund their own classrooms and are not accustomed to seeking out external assistance in obtaining needed supplies. In recognition of this, some teachers mentioned they wished they would have advocated for themselves more when difficulties such as this arose.

These difficulties notwithstanding, it is clear that teachers loved working with the NWF team. In their feedback, they often highlighted how supportive, responsive, and communicative team members were. They appreciated how quickly the NWF team responded to their inquiries. Teachers felt the NWF team truly listened to their concerns, and they appreciated how the NWF team involved them in program development, compensated them for their time, and directly engaged students.

Teachers also valued the experience of working with community partners and reported learning much from them. One teacher applauded community partners for helping their students discover ways of *"talking to politicians."* At times, however, teachers believed that interactions with community partners would have been more effective had partners been informed of the students' particular needs and circumstances. For example, a teacher who works with special–needs students observed community partners struggling to work with neurodivergent youth during a field trip. This was not a concern that was communicated to the RiSC project team in advance of the events and represents an opportunity for both teachers and RiSC team members to prioritize communicating about in preparation for events in the future.

While partners who led and facilitated the dune grass planting field trips as well as in-classroom public speaking training did work with youth regularly, some partners expressed that working with youth was not something they typically do in their daily roles which made it hard for them to always engage the groups they were working with. Teachers often struggled to control the behavior of their classes, causing disruptions for some community partner activities. Research by EdWeek Research Center in 2023 (Prothero, 2023), found that seventy percent of educators reported that students were misbehaving at higher rates post-pandemic as compared to the Fall of 2019. The article goes on to report that educators found the pandemic had negatively impacted student motivation and morale. This is an important context to bring awareness to in our reporting on challenges working with youth during the project timeframe.

Collectively, the interviewees thought that providing partners with training on working with youth would prevent these kinds of difficulties from arising. Teachers would have liked more time spent with the community partners, including classroom visits or conversations. Future iterations of RiSC may include such conversations between community partners and teachers about behavioral expectations on field trips and at events, and best practices for managing disruptive behavior.

Community partners also derived much value from their work with teachers and the NWF team. A few had not worked with K–12 populations before, and they were excited to build out their science communication skills with youth. As in Year 2, however, some community partners felt they needed more opportunities to interact with the program—for example, through in–class visits or short updates from teachers or the NWF team. In a summative interview, one community partner said that by the end of the project they felt much more connected to the program, and that communication was better once they had more of an established relationship with the project team, had more of a rhythm of working together, and had a *"better understanding of how what I'm doing fits into the big picture of the curriculum."*

Program Impacts

As in Year 2, teachers reported that the RiSC program is raising student awareness of climate change, increasing their knowledge of climate impacts, and deepening their ability to communicate about and engage with these topics. From an evaluation perspective, precise impacts are often difficult to measure, as even when in possession of a system for generating baseline data on student performance, determining changes in knowledge and skills is an imperfect science (one that requires researchers to control for compound effects). Nevertheless, it is clear from both teachers' recollections and students' own work that RiSC effectively promoted knowledge and skills acquisition.

Interest and Engagement

Regardless of whether they were new or returning, RiSC has succeeded in sparking students' interests in climate change, yielding high levels of engagement with curricular activities. Students' enthusiasm was especially apparent during field trips, which most reported wanting more of. These outdoor activities *"grasped their interest right away,"* one teacher observed. *"They loved the field trips,"* another shared, adding that students *"spoke to everybody they could speak to while they were there."* Teachers also reported that students enjoyed producing podcasts; one said this was students' *"favorite part"* of the program. Direct evidence of students' appreciation for the program can be seen in their responses to the postcard activity—three of which included the words *"I love RiSC."*

Beyond simply generating interest, some teachers and community partners commented on how participating in RiSC had encouraged students to think about climate–related career possibilities. Commenting on the value of the podcast activity, one teacher explained how this *"helped a lot of them figure out what they wanted to do." "They knew they loved the environment,"* this teacher continued, *"but they didn't know that . . . could be a career option for them."* Echoing this, a high school teacher said that RiSC

> *had a huge impact on them deciding what they want to do . . . I have had a few kids who graduated this year who are going into environmental science . . . It has been helpful to help kids see . . . what green careers are out there.*

Both teachers and community partners agreed there was a *"tremendous need"* to expose students to different kinds of climate–related career paths, and they felt the program could have done more to provide some of the basic knowledge and skills required for work within this occupational sector. One interviewee suggested the curriculum include information

about how different kinds of environmental organizations are structured—for example, *"the difference between working for a public organization and a nonprofit and a private organization."* Others recommended that the NWF team host discussions or talks featuring guests from different kinds of climate–related professions—or even a *"career day for our environment."* Given the fact that some students are thinking about ways to bring about change, interviewees believed that adding a career preparation and job readiness component to the curriculum would be beneficial.

Knowledge and Learning

Participating in RiSC has helped students become more knowledgeable about climate change, their local environments, and ways to promote community resilience. Much of this knowledge growth has emerged through the curriculum's hands–on activities; according to teachers, *"being out in the environment"* has promoted the kinds of *"tactile"* learning needed for an in–depth understanding of these topics. Through out–of–classroom experiences, students have learned that *"you can have science integrated into your everyday life"*—that is, that climate science *"doesn't have to be this scary thing of math and concepts you don't understand."*

Environmental Literacy

Evidence from students' work suggests that RiSC is supporting learning in environmental science and promoting the development of climate knowledge in a way that is highly relevant on an individual level. Two–thirds of the 60 samples (n = 37) from the "Postcards to the Future" activity Knology reviewed focused on what students learned from RiSC. Six of these cards focused on knowledge of climate change impacts, including comments such as *"We have found many ways to prevent global warming so that we are no longer harmed by its terrible effects."* Elaborating on this, many other students highlighted specific pro–environmental behaviors to improve Coney Island—including reducing carbon footprints and pollution, recycling, developing renewable energy sources, and creating green spaces. Some of these students highlighted ways to *"give back to the Earth"*—for example, by releasing more oysters into the water. Stressing the importance of local clean–up campaigns, one student wrote: *"Keep working on keeping the community clean, now the air is clean, the street is clean, the water is clean and coney island is full of trees."*

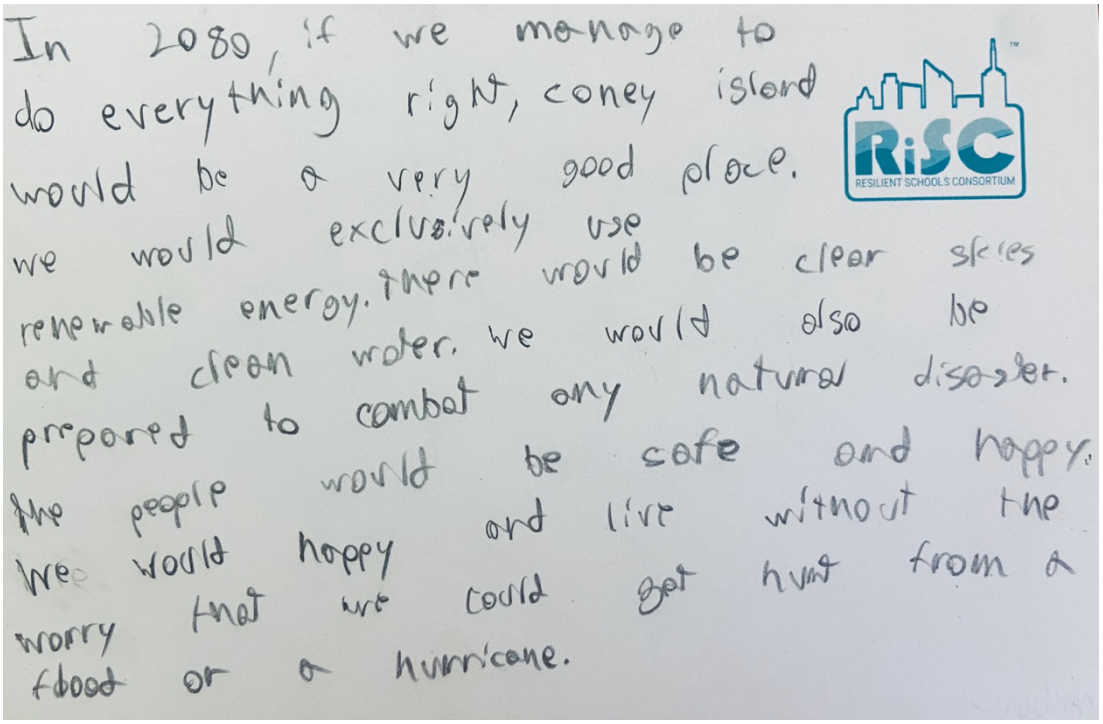

Figure 1. A RiSC Student's "Postcard from the Future"

We also saw evidence of students' increased knowledge of climate change and the environment during the Open House event, when they shared what RiSC had taught through short statements written on paper fish. The theme of the Open House was Coney Island's past, present, and future. The fish were placed in an area of Kaiser Park that was under water during the glacial age and that will flood again if nothing is done to curb emissions. Students' statements, which were staked into the ground and made available for public viewing, reflected an accurate understanding of climate change's causes and implications. Some students communicated basic knowledge such as:

- *"Sea level rise causes floods."*
- *"Climate change is a result of greenhouse gasses."*
- *"Global warming is not a prediction."*
- *"We are part of the reason for climate change."*

Other students displayed a more in–depth understanding of the local environment around Coney Island. "*During my time in the RiSC program,"* one student's fish read, *"I have learned a multitude of essential things to take note of when it comes to the sea, such as thermal expansion and glaciers melting."* Along similar lines, another student reflected on how they *"learned that beaches provide important shelter for the wildlife that lives there. They also provide protection for the land by preventing waves from eroding the land."*

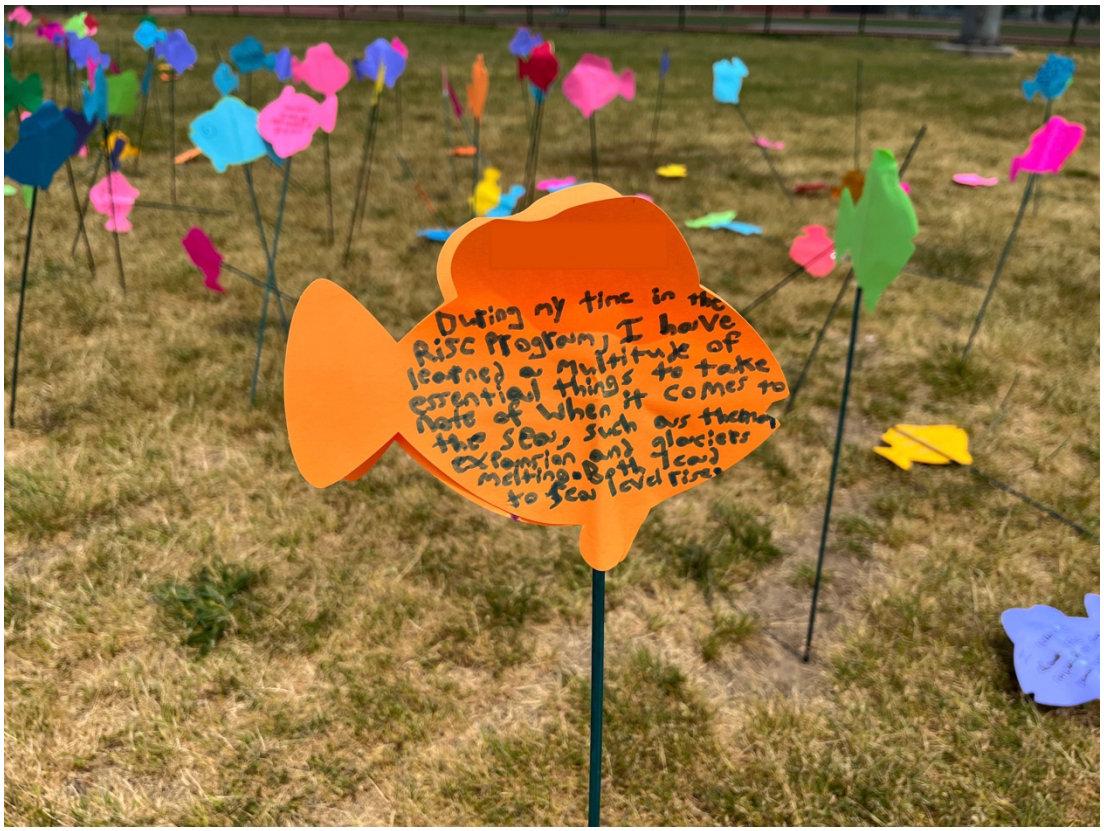

Figure 2. A RiSC student's response to the Fish Activity from the Year 3 Open House.

Social Vulnerabilities

In addition to learning about the scientific and environmental aspects of climate change, students also acquired more in–depth knowledge of this topic's social and historical dimensions. While many students came to RiSC with some understanding of climate risks and their local impacts, the program helped them situate this understanding within a broader context. As they learned about the connections between environmental and social challenges, students came to see—as one teacher put it—that *"climate is experienced differently by different people, from different economic groups,"* and that *"some people have it harder than others in that way."*

Particularly helpful here were the podcasts students produced. Knology reviewed six publicly distributed podcasts (approximately two hours of audio content), most of which consisted of interviews with local Coney Island residents looking to promote a safe and healthy community for all. As these residents elevated local knowledge and lived experiences (especially in connection with events such as Hurricane Sandy), the podcasts gave students an opportunity to learn about the intersection of natural disasters and local social changes such as development and gentrification. Many podcast guests also talked about how spreading knowledge and awareness can benefit the community in many ways, such as increasing emergency preparedness as well as building community and resilience through the exchange of information and local action. Through their thoughtful and well–informed questions, students demonstrated good critical thinking skills, along with a knowledge of concepts such as climate resilience and preparedness. Teachers found the podcast project

very valuable as a way to engage with the community and for students to talk to a range of people, emphasizing the importance of connection and *"amplifying community voices."*

Students' postcards also revealed what they had learned about these topics. Some of these postcards focused on social issues such as crime, poverty, homelessness, and community development. In their statements, students talked aspirationally about having a thriving community that is working together and co–existing with nature. This included references to dune plantings and to providing the community with the resources needed in advance of climate threats. One student wrote of a future in which *"we would be prepared to combat any natural disasters,"* and in which *"people would be happy and live without the worry that we could get hurt from a flood or a hurricane."*

Responses to the fish activity also served as an indication of what students had learned about climate change's intersections with social vulnerabilities. *"I learned a lot about the environment and the community, like redlining and sea level rise"* one student wrote, adding that *"my message to the past is to not ignore the problems even if they don't affect you."*

Civic Engagement

Teachers observed that the process of learning about resilience showed students how they can contribute to climate action. Some students without any pre–existing knowledge of climate change or local climate impacts *"became very invested"* in these topics on account of RiSC; *"now they're like advocates,"* one teacher said.

Social–emotional learning has been key to this process. Given the positive, solutions–focused nature of the program, teachers felt comfortable encouraging students to safely explore unpleasant feelings they might otherwise push away. Students responded positively to these overtures, participating in *"heart to heart conversations"* in which they shared personal stories about climate change's impact on their personal lives. In addition to bringing them together, these conversations were incredibly validating for students. *"It legitimizes what they're thinking about,"* one teacher said, *"their fears, their hopes, the fact that maybe things might change, and then them as being powerful to interact with things."* Multiple teachers explained how the curriculum's emphasis on social–emotional learning allowed students to become more comfortable and confident in talking about vulnerable topics that hit close to home.

Given the circumstances confronting some RiSC students, this is a significant outcome. Teachers noted how their students come from *"many different walks of life,"* and are confronting *"many different problems and struggles."* Whether it be due to the impacts of climate change, COVID-19, or of living in a *"high poverty area,"* many students living within the Coney Island area *"have gotten the brunt of a lot of it to an unfair extent."* In these circumstances, maintaining a *"positive outlook"* on life can be quite trying.

And yet, RiSC has helped maintain and build this positive outlook. With the increased resilience the curriculum has enabled, students have felt empowered to build a better tomorrow within their communities. More than anything else, what they have learned about climate action is that *"they can impact change."* As they became more informed about local social and environmental vulnerabilities, they came to understand that *"they have a voice,"* and that *"they can feel empowered to make changes [with] things that they're not happy*

with." Students also realized they want to use their voices; as one teacher said, *"most or all of them want to do something related to this in the future and how to actually affect change."*

As this indicates, RiSC is teaching students that *"if you care about something, you can fight for something"*—not only climate change, but also other subjects of local importance, including police brutality and racial inequality. As one teacher put it, the broader value of RiSC has to do with how it showed students how to *"find information about a topic and be able to make an argument for things they want to see."*

Evidence from Year 3 of RiSC suggests that students are internalizing these messages. Summarizing what the program had taught them, one student who completed the fish activity wrote the following:

> *I learned that a lot of things can cause sea level rise or too much car usage can pollute the air or any use of carbon gasses. My message to the past is we should have taken better care of the Earth, better usage of energy, and taken action straight away instead of waiting.*

Some students have already begun taking action within the community. A number of RiSC participants contributed to civic actions in connection with the controversial Coney Island NYC Ferry. By writing letters and making their voices heard, they helped bring about a pause in the ferry's operation (Honan, 2022). RiSC students have also contributed to actions designed to mitigate the impacts of rising sea levels—for example, by planting grasses along shorelines to help provide protections for coastal housing (Starling, 2023).

Skills Growth

Teachers witnessed significant amounts of skills growth among students. Particular areas of development included:

Critical Thinking

Throughout their engagement with the program, teachers have observed students utilizing and strengthening their critical thinking skills. By making direct connections between curricular content and their daily lives (and the lives of those around them), students expanded their perspectives on all of the various environmental, social, and historical factors that make climate change such a difficult problem. Evidence of critical thinking was often seen in the questions they asked of each other and their teachers—for example, *"How are we going to live here in the future?"* In one class that conducted a mock United Nations debate, a teacher noticed more evidence of critical thinking in students' abilities to *"see both sides of an argument and be able to express that."*

Problem Solving

Many teachers observed evidence of problem solving in their students, who are beginning to develop ideas about how to create positive social change in their communities. During summative interviews, teachers shared how some students have also started to change their own behaviors—for example, by reducing their use of plastics and forcing *"their parents to recycle."*

Public Speaking

To help them improve their communication skills, In Years 2 and 3, a public speaking trainer was formally brought into the program to coach students on the basics of public speaking. During Year 2, due to scheduling challenges, each school had one virtual session with this trainer in April 2022. In Year 3, the trainer delivered two in-person trainings - in January 2023 and in end-May/early June 2023, just before the Open House. After learning how to present their ideas in public spaces, teachers challenged students to use these new abilities through opportunities that allowed them to "speak out loud to a group." To promote further development of these important skills, teachers suggested that students also be encouraged to talk to local decision makers.

Leadership

Similar to previous years, teachers noted that students' leadership skills were growing and finding expression through RiSC. As it builds their confidence in discussing climate change at school and in group settings, the program was also helping them take positions of leadership in thinking about how they can be more involved in local communities. *"I definitely have seen more competence in leadership,"* one teacher said of their students.

This phenomenon was particularly observable among returning RiSC students—many of whom became mentors for new students. In some instances, returning students helped guide classroom discussions, sharing their in–depth knowledge of concepts like coastal resilience and helping others engage RiSC materials on a deeper level. In summative interviews, three teachers said they planned to have returning students become leaders in the program in the future. One of the teachers who implemented this reported that their students felt empowered mentoring others.

Discussion, Recommendations, & Conclusion

Throughout the project, teachers and community partners expressed strong support for and interest in the program's goal of equipping youth with the knowledge, skills, and resources needed to build climate resilience within their communities.

Both teachers and community partners appreciated the NWF team's efforts to bring them into curriculum design, program development, and event planning. They found the program well–suited to the needs of diverse students, and they appreciated the curriculum's focus on solutions, the social and emotional dimensions of climate change, and individual and community empowerment. Both groups agreed that the RiSC model is broadly applicable and capable of being exported to schools in any part of the country facing climate–related risks.

Teachers and community partners enjoyed working with each other, and learned much about how the process of developing deeper ties could promote progress toward reducing climate–related harms. As in previous years, however, their experiences indicated the need for more regular interactions and more frequent communication.

Returning teachers felt more knowledgeable and more confident in their ability to implement the curriculum in Year 3. They felt empowered to *"have real conversations"* with their students and reported making progress in helping students see the interconnections between climate vulnerabilities and various kinds of social and economic vulnerabilities. Being more familiar with the curriculum, several made adjustments to this, adding their own resources, making connections to other school subjects, and devoting more time to projects that prevented the program from feeling repetitive to returning students. While these modifications were helpful, teachers said more guidance from the NWF team would have been helpful. The only part of the curriculum they struggled with was the Open House event, which many teachers said could have been improved and provided suggestions for future iterations.

Despite this, it is clear that RiSC piqued students' curiosities, deepened their awareness of climate change, and gave them a hopeful, optimistic outlook on their ability to successfully prepare for and respond to the various climate–related threats they will face over the course of their lives. Students enthusiastically participated in RiSC; some became so interested in the topics covered by the program that they had begun to consider careers in climate–related fields. As they increased their understanding of climate change's impacts within Coney Island and other nearby communities, they deepened their understanding of how structural inequities born of racial discrimination, economic marginalization, and political disempowerment place historically and persistently excluded groups at greater risk of climate disasters than others. Learning about local histories and the lived experiences of community members also impressed upon students an awareness of how things can change and how through concerted, collective action they can help build a better, more equitable world. By strengthening their critical thinking, problem solving, public speaking, and

leadership skills, many students have already begun to build that world—either through changes in their personal behaviors or by advocating within their communities.

Causal Pathways

As noted above, our evaluation was informed by NOAA's ELP Community Resilience Education Theory of Change, which is intended to demonstrate the value of education as a means for *"build[ing] community resilience to extreme weather, climate change, and other environmental hazards"* (Bey et al., 2020). Each year of the project, we measured both the design and implementation of the RiSC curriculum against the theory's overall outcomes and goals. A particular aim of our evaluation was to determine how aligned RiSC with the six causal pathways NOAA has identified as critical to the creation of informed, resilient communities.

Our Year 2 evaluation focused on the second and sixth of these pathways: ***resilience planning and policies integrate education*** and ***youth summits empower agents of change***. During our Year 3 summative review, we looked more holistically at RiSC's alignment with NOAA's Theory of Change, assessing the project's many different parts in conjunction with all six causal pathways. Our evaluation indicates that, to different extents, RiSC was aligned with all of these pathways, and made progress toward a number of the short– and mid–term outcomes associated with each of these.

Causal Pathway #1: ELP Community of Practice Advances Effective Approaches

As can be seen in the feedback we received from teachers and community partners, RiSC succeeded in creating *an effective approach for community resilience education*. It is also clear that teachers increased their *knowledge and skills related to community resilience education*. Also, though creating a community of practice was not one of RiSC's explicit goals, across three years of program implementation, we saw evidence of such a community emerging. This evidence indicates that with more engagement between project leaders, teachers, and community partners, future iterations of RiSC could look to develop a community of practice.

Causal Pathway #2: Resilience Planning and Policies Integrate Education

From the very beginning of the program, the RiSC team included a number of local resilience practitioners who committed to *being advisors on and participants in community resilience education projects* that were a part of RiSC (as described in the introduction of this report). These practitioners utilized their expertise, localized data, and resilience plans as project partners. Their feedback indicates that these community partners *supported education as an essential process for achieving environmental literacy and helping to build community resilience*.

Causal Pathway #3: Active Learning Enables Community Engagement in Civic Processes

While this causal pathway was least aligned with RiSC's goals and objectives, progress was made toward two of the mid–term outcomes associated with it. First, through participating in curricular activities and events, RiSC students acquired the *knowledge, skills, and confidence (i.e., environmental literacy) to become civically engaged in resilience issues*. Second, as interviews with teachers revealed, RiSC also helped these students *feel empowered to improve their community*.

Causal Pathway #4: Understanding Cultural and Historical Context of Place Builds Social Cohesion

RiSC worked toward a number of short–term outcomes associated with this causal pathway, along with one mid–term outcome. On account of the curriculum's multidisciplinary focus, students and teachers alike learned a great deal about the intersection of *local social, economic, and political history as it relates to natural resources that are important to their community*. During classroom conversations, they *shared their own lived experiences about local impacts of climate change and extreme weather*, and activities like the oral history podcast gave them an opportunity to both *learn from older adults within their community about local impacts of climate change and extreme weather events* and to *use storytelling and other arts to share that knowledge with others*. Both students and teachers developed an *understanding of legacies of systemic and historical marginalization of certain groups, and the resulting unequal distribution of environmental impacts within a community*.

Causal Pathway #5: Student–driven Action Projects Implement Resilience Measures

RiSC students and teachers collectively made progress toward five short–term outcomes connected to this pathway. By contributing to both the design and implementation of RiSC, teachers acquired an understanding of *how to use a curriculum and integrate relevant, credible data to guide their exploration of locally relevant environmental hazards*. Through classroom activities, field trips such as beach grass planting, and other out–of–school events, teachers and students followed this curriculum to *guide their exploration of locally relevant environmental hazards*, engaging in *active learning experiences that helped them identify and understand place–based environmental hazards and their impacts*. They came away from these experiences with a better understanding of the *uneven exposure to environmental hazards and unequal access to resources within their communities*. In part, what made these experiences so educational and empowering was the fact that *local experts and community members were engaged with the development of student–driven resilience action projects*.

Causal Pathway #6: Youth Summits Empower Agents of Change

RiSC was most directly aligned with this causal pathway, and it fulfilled many of its short–term and mid–term outcomes, along with one long–term outcome. The curriculum's hyper–local focus, along with the opportunities this afforded for fieldwork and community engagement, ensured that students gained an *understanding of what is unique about their*

community and how their local economy and culture may be impacted by climate change. The training they received from the public speech trainer helped students *develop their understanding and communication skills*, while conversations with peers and community members (especially during the podcast activity and at Open House events) helped them *build confidence through presenting to one another, working in teams, and discussing among one another*. Students (especially those who participated in RiSC in multiple years) benefited from numerous leadership opportunities, and by participating in end–of–year Open House events, students both prepared for and participated in *youth summits*.

With regard to mid–term outcomes, RiSC gave teachers *increased knowledge and confidence to teach about climate change and other local environmental hazards*. Both students and teachers came to *understand their community's disparate social and economic vulnerabilities to climate change and other environmental hazards*, and they were able to *connect these vulnerabilities to systemic social challenges*. Moreover, students have begun to *make informed decisions related to extreme weather preparedness and climate change adaptation and mitigation*.

Perhaps most promisingly, RiSC showed students how to be hopeful about their community's future, helping them see that through their actions, progress can be made to address climate change and other environmental hazards—and to create positive social and political change (as evidenced by RiSC students' participation in civic action that brought about a pause to the running of the Coney Island NYC Ferry). The achievement of this long–term outcome underscores RiSC's status as a model for environmental education programs.

Recommendations

Though this project has come to an end, our Year 3 evaluation revealed several opportunities for continued growth and development within the consortium. On the basis of conversations with teachers and community partners, we have devised a list of recommendations designed to promote further expansion of the work RiSC has started.

Create Multilingual Materials and Resources

To help all students learn about climate change and its impacts, programs such as RiSC would benefit from the creation of multilingual resources. By providing information in students' native languages, these programs will not only foster equity in learning, but also help multilingual learners engage in climate–related discussions with those non–English speakers in their families and communities (Tuvilla et al., 2018). These discussions can facilitate the inclusion of voices that have been historically excluded from civic engagement related to climate change and other social problems (Kayumova & Tippins, 2021).

Seek Student Input

Perhaps more than anything else, what made RiSC effective was the fact that project partners possessed an in–depth knowledge of the Coney Island community and its history, which was infused into many aspects of the curriculum. As this suggests, curricula created by the consortium need to be informed by place–based understandings of climate change and

its impacts. Beyond this, the process of program design needs to be one that local residents and community organizations are actively involved in. This includes students themselves, whose interests, needs, abilities, and circumstances need to be factored into curriculum development. As one teacher noted, by learning about what students care about and how they want to engage with the program, project leaders can support the goal of differentiated learning, ensuring that programs like RiSC speak to students' diverse concerns and needs. Deploying social media–based strategies (such as TikTok) would help the NWF team meet students where they are.

Provide Training on Working with Youth

Teachers who know their students best are responsible for the behavior and actions of themselves and their students at events and should be primed to advocate for any unique needs or accommodations that their classes require. Students have different cognitive styles, abilities, and needs, and a knowledge of these can aid program implementation. By asking teachers to share information about these things prior to the start of any extracurricular activity, project leaders will be well-positioned to ensure that scheduled events meet the needs of all students—including those who are neurodivergent.

Project leaders and/or teachers can also share this information with community partners in advance of events and provide training to those who have little or no experience working with youth. Doing this will facilitate community partners' preparation efforts, and also help ensure that activities are conducted with students' different needs and abilities in mind.

Encourage Public Speaking

Public speaking is a key advocacy tool, and a prerequisite for effective civic engagement. Through the support they received from a public speech trainer, RiSC students made strides in terms of their ability to communicate effectively in public. To truly promote the acquisition of leadership skills, programs like RiSC will need to give students ample opportunities for developing and using their public speaking skills. Ideally, these opportunities would allow them to speak not only with classmates, peers, and neighbors, but also with politicians and decision makers. Hosting public speaking sessions with a variety of different audiences would significantly improve the ability of youth to speak out and use their voices to advance positive social change. The Open House is one place where more public speaking could be integrated into the program.

Amplify Career Awareness

Given the fact that several participating students indicated an interest in pursuing climate–related careers, programs such as RiSC would benefit from the addition of curricular resources and activities focused on job readiness and professional development. As noted above, several interviewees advised that the NWF team host events (such as a *"career day for our environment"*) aimed at informing students of different climate–related occupations. By including curricular activities focused on green sector jobs and careers, programs such as RiSC could help aspiring climate professionals begin the process of acquiring the skills and knowledge required for success in these fields.

Develop Internal Assessment Tools

Participating teachers did not generally attempt to assess students' background knowledge prior to implementing the curriculum. Because of this, it was difficult for them to definitively determine how much students had learned from RiSC. To help them conduct a before and after evaluation of the program, it would help to devise a set of tools that teachers could use to measure knowledge acquisition and skills growth. This could include more regular embedded activities that produce evidence of learning and engagement, like "Postcards from the Future" or the fish activity at the Open House.

Promote More Regular Interactions Between Teachers and Community Partners

Throughout the three years of the project, members of the consortium established effective working relationships with each other. By the end of the project, each arrived at a fairly comprehensive understanding of how their individual work fit into the big picture. Nevertheless, as is always the case with projects of this sort, interactions did not always advance the consortium's goals as smoothly or efficiently as they might have. At times, these interactions yielded frustration, confusion, or feelings of isolation. To create harmonious bonds between partners, establishing communications channels that allow for regular back–and–forth dialogue before, during, and after project activities is essential.

Conclusion

RiSC's long–term goal is to provide youth will the knowledge, skills, and tools they need to successfully combat climate change and its impacts. To make progress toward that goal, project partners have identified two key prerequisites for effective climate action: a knowledge of the social and economic inequities that underpin and exacerbate climate change's myriad threats to human communities and the natural world, and a knowledge of how personal and collective action can work to mitigate these threats. The fact that RiSC students have emerged from the program hopeful about the future and committed to taking action against climate change is a strong testament to the effectiveness of this approach, and bodes well for the program's future. By combining science, history, social–emotional learning, and civic engagement, RiSC has created a model of environmental education that can be utilized within school districts all across the US. It is now left to others to carry this work forward.

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