Healthy Environment, Healthy Communities

A Youth-Designed Exhibition for Environmental Justice

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Student Sofia Azmal (center) and her classmates begin work on the diorama of New Haven's English Station.

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Tall weeds and broken glass line the concrete drive leading to the English Station power plant. Located in New Haven, Connecticut, the nearly 100-year-old oil and coal-burning facility was closed more than 20 years ago. Shuttered and abandoned today, its heavy metals, PCBs, and other carcinogens contaminate the site – a mere 500 feet from houses, apartments, and an elementary school. Recent media reports claimed that remediation was imminent, but the plant remains.

A few miles away at the Yale Peabody Museum of Natural History, a group of high school students and their instructors are researching and discussing the issue of environmental health. English Station and its contaminants is an active topic. Soon these students – part of the Peabody's EVOLUTIONS afterschool program – will turn this research into an exhibition on the museum's second floor that will bring relevant local issues to the Peabody's predominately local visitorship.

As the greater museum community at large faces topics of global change, biodiversity loss, and community health, a commitment to local, teen-curated exhibitions can produce an effective call to action for the community and its citizens. It is a commitment that reaches not only the teen participants but also their families and peers. And by engaging teens in real science and real issues, museums can serve as venues for conversation, sharing, and true agents of change within their communities.

EVOLUTIONS

EVOLUTIONS (Evoking Learning and Understanding Through Investigations of the Natural Sciences) engages 120 high school students from 10 schools in the New Haven and West Haven public school districts – urban districts that serve primarily low-income communities. It is a free, multiyear science and college-focused program that engages students in formal and informal learning opportunities designed to address scientific literacy, college preparation, career awareness, and transferable skill development. Approximately 60 percent of EVOLUTIONS students are female, 60 percent are eligible for free or reduced meals at school, 20 percent speak a language other than English at home, and half will be the first in their families to attend college. Eighty-five percent identify as students of color.

Program participants attend weekly afterschool classes throughout all four years of high school. Together they form a community of STEM-focused, academically driven youth leaders, and represent a key Peabody initiative to bring science and local neighborhoods together. After their first year in the program, students may apply to work as science interpreters for the museum through the program's SciCORPS youth employment program. Forty students work as SciCORPS members, staffing hands-on interpretive carts and interacting with the museum's visitors. Beyond the content enrichment that it offers visitors, the SciCORPS program directly addresses the need to have community representation among the museum's staff and within its galleries. Two-thirds of the city's residents identify as people of color, creating a disparity between the museum's traditional staff and its surrounding neighborhoods. The presence of SciCORPS interpreters at the museum works to bridge this gap.[1]

1 For more about the EVOLUTIONS program at Yale's Peabody Museum, please visit evolutions.peabody.yale.edu.

fig. 1. Title graphic and panorama of *Healthy Environment, Healthy Communities*.

For the Community, by the Community

Key to the EVOLUTIONS curriculum is an exhibition design project, which engages students in approaches to science communication and reinforces a series of transferable skills, including writing and graphic design. Sophomores and juniors from all 10 high schools work together to develop, design, and construct a 150-square-foot exhibition. The exhibitions rotate on an annual basis, opening to the public in May and continuing through April of the following year.

Critical to the students' success – and therefore that of the exhibition as a whole – is close coordination with the museum's permanent staff. EVOLUTIONS staff and students work closely with the Peabody's exhibition design studio to learn museum standards and practices for engaging visitors. They also work closely with the Peabody's production studio, overseeing the construction of casework and other fabricated elements, and closely with the Peabody's scientific staff to ensure that all exhibition content is correct. Following the process for all Peabody exhibitions, the museum's director of public programs reviews and ultimately approves all elements before the start of fabrication. By embedding the student's exhibition into the Peabody's broader exhibition calendar and development process, the program ensures an authentic experience for the students while simultaneously exposing them to the many skill sets and possible career paths found within the museum's studios, labs, and offices. Further, Yale undergraduate students serve as classroom instructors for the program, providing additional assistance and mentorship.

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Early within the academic year, the students are offered a general theme on which to develop their exhibition. Previous themes have focused on food production, urban wildlife, and – for the Peabody's sesquicentennial celebration – a glimpse into the museum's collections and research. But the 2014/2015 academic year brought a number of social and environmental issues to the forefront of classroom conversations. Three young Black men – Michael Brown, John Crawford III, and Tamir Rice – were killed by police that year in high-profile incidents. And the water crisis in Flint, Michigan demonstrated that failing infrastructure placed people of color at risk for lead poisoning. In light of such incidents, EVOLUTIONS' predominately Black and Latino students voiced concerns that their lives were not as valuable as those of others. They expressed that while the Peabody was a second home, the museum's exhibitions don't always represent them or the issues relevant to their daily lives. This disconnect led to conversations about the role that a science museum could (and should) play in educating the public about social justice issues in its community, including that of environmental health. Through classroom conversations about the history of the environmental justice movement, students narrowed the exhibition theme to include issues that were likely to affect them and their families most, and selected the title *Healthy Environment, Healthy Communities* (fig. 1).

To inform the exhibition development process, EVOLUTIONS program staff introduced statistics regarding environmental health issues that affect low-income communities, shared writings by Black activist scholars, and highlighted local and national organizations that are actively addressing environmental concerns that disproportionately affect communities of color. English Station, as one powerful example, is surrounded by a predominantly Hispanic neighborhood that is home to many of the students in EVOLUTIONS. Following these conversations on environmental justice, 70 students formed small teams of five to six members, and each group was charged with identifying a local topic on environmental justice that they felt was important for Peabody visitors to understand. The teams then researched their chosen topic and selected the exhibition format to communicate that topic. Topics included water contamination, air pollution, city planning, green spaces, energy conservation, and food waste.

One team designed and constructed a diorama of the English Station power plant

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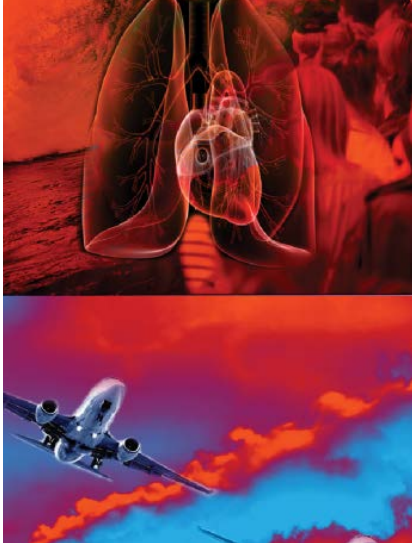

COURTESY OF YALE PEABODY MUSEUM

(intro image & fig. 2). They wanted to heighten awareness that local neighborhoods are bearing the burden of recognized environmental hazards rarely faced by wealthier suburbs. The miniature was ironically but not coincidentally constructed of recycled materials to replicate the three-story structure and its surrounding, contaminated land. In a related display, a team designed and produced an infographic that illustrated the dangers of mercury contamination, which occurs through the consumption of fish harvested from local waterways and disproportionately affects low-income communities.

Another team focused on the relationship between air quality and human health. Rather than create a panel filled with facts and figures, the group opted to use their newly developed graphic-design skills to create a set of abstract art posters that overlaid images of human hearts and lungs with images of city buses and airplanes (fig. 3). Several students also used their artistic abilities to translate hand-drawn sketches into a comic-book style poster that described CO_2 remediation methods to allay air quality issues.

Finally, only a few months before the Flint water crisis made national headlines, one of the exhibition teams researched water infrastructure in New Haven. The students found that aging systems resulted in sewage runoff that could put neighborhoods at risk of exposure to pathogens, and that pipes in older homes were more likely to contain lead and other heavy metals.

But beyond simply identifying environmental hazards, students also chose to introduce calls to action for the issues addressed by the displays, which led to a positive tone throughout the narrative. For example, a diorama that focused on storm runoff within urban settings also included the concept of rain gardens and their ability to reduce contamination associated with urban runoff.

Lessons and Impacts

Taken together, the student teams, their individual displays, and the overall exhibition addressed the extremely relevant topic of environmental health within the New Haven community. Essential to the success of the exhibition was that those who live in these communities curated its displays. As such, a truly unique, community-driven narrative was achieved and the relevancy of the exhibition's messages was evident. It also led to a solutions-based narrative; those who live in these communities wanted to learn not only about their local environments but also how to care for them.

During the ribbon-cutting ceremony, many of the students' extended family members visited the museum for the first time (fig. 4). Parents took photos and grandmothers wiped away tears as they viewed the students' work hanging on the walls of the Yale Peabody Museum of Natural History. As each student group stepped on stage to talk about their work, they beamed with pride, fighting through nervous energy to share what their project meant to them. Ultimately, it meant that their voices were heard. It meant that their community mattered. It meant that they were the producers – not just the receivers – of knowledge. And as one student reported in program evaluations, "I got to connect with amazing people who share similar interests whether they are my age or not. I also was able to share my knowledge with people who respect it."

Realization of the EVOLUTIONS exhibition is rooted within an

fig. 2. (left) Completed diorama of English Station (foreground) alongside a diorama that supports messaging related to water pollution.

fig. 3. (right) A student-created art poster conveys the impact of industrial emissions on human health.

fig. 4. Families and friends of the program's students at the exhibition's opening celebration.

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institution-wide commitment. While the completed exhibition is intended to showcase the students' work, the students' interactions with permanent staff from the exhibitions, education, and collections departments ensures that the exhibition – while representing the students' voice – meets current Peabody standards. To that end, the student exhibition is now embedded within the museum's annual calendar of work within the exhibitions department, and a dedicated footprint with the museum's galleries is now established.

For the students, it leads to a greater understanding and appreciation of their local landscape, and also serves as a catalyst to create broader connections within the community. For example, the relationship that students Sofia Azmal, Alice Li, and their peers built with a local environmental group while doing research for the exhibition evolved into summer internships, where six other students worked with faculty from two universities to collect air and water samples to study mercury levels along the harbor. Sofia is now a public health major at the University of Rochester, and Alice will be studying biology at Yale. But ultimately the project proved to be greater than the sum of its parts. Its exhibition created a platform for local voices, and it continued to further establish the Yale Peabody Museum as a venue where science and the local community can come together. ▮

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