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Sharing ideas to create a more just and sustainable future through the power of environmental education

Cover Photo: Students at Glen A. Wilson high school take outdoor air quality readings using a portable sensor, API Forward

CASE STUDY

Asian Pacific Islander Forward Movement (API Forward)

Air Quality Workshops for Urban Students

Los Angeles, California, USA

CONTRIBUTOR

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GEEP is a partnership of the U.S. Environmental Protection Agency, the Environmental Protection Administration of Taiwan, and the North American Association for Environmental Education.



API Forward – Air Quality Workshops for Urban Students



GOALS KEY

[United Nations Sustainable Development Goals](#) addressed

Overview

This case study describes how one community-based organization is engaging high school students in ongoing study and action learning toward the goal of improving air quality.

In Southern California’s San Gabriel Valley, more than 25 schools are located within 500 feet of the Los Angeles basin’s notoriously clogged freeways, exposing students to high levels of air pollution. In 2013, the [Asian Pacific Islander Forward Movement \(API Forward\)](#) began working with some of these schools to educate and empower students to work toward changes in the air quality on and around their school campuses.

This case study illustrates how:

- Students benefited from environmental learning experiences that connected to their everyday lives and communities
- Short-term learning experiences became a valuable way to cultivate relationships that could lead to extended engagement
- Programs benefited from collaboration with a broad network of partners working toward common goals



Photo: API Forward

Background

Photo: Students take outdoor air quality readings. (API Forward)



The mission of API Forward is to empower Asian and Pacific Islander communities in Los Angeles County to improve their health by addressing social, cultural, environmental, and political factors that contribute to growing rates of obesity among these residents.

API Forward works on a range of issues connected to obesity, ranging from bicycle and pedestrian safety to food access, community safety, and access to nature. They knew that issues such as air and noise pollution affected people living in urban areas, and that many people in their community lived near pollution sources such as freeways, busy streets, rail lines, and airports. As they learned more, they realized that many types of air pollution—especially the particulates emitted by vehicle traffic—are linked not only to lung problems, but also to other health issues such as obesity and diabetes.

To address these issues, API Forward began working with Los Angeles County high school students. What started as a special project with the senior honor society at [Mark Keppel High School](#) (MKHS) has now been adopted by the school's youth advocacy club. API Forward supports club members in this predominantly Asian and Latino school as they work to improve air quality on and around their school campus. API Forward has built on this work in 10 other schools by engaging more than 150 students in one-to-two-day air quality monitoring workshops. During the 2016-2017 school year, API Forward began working with [Abraham Lincoln High School](#) to increase the program's impact, expanding its focus on student ideas for action on environmental issues that disproportionately affect communities of color.

Approach

To engage students with air quality issues, API Forward relies on two key program components:

- One-to-two-day, hands-on air quality monitoring workshops, and
- Ongoing, customized engagement with school clubs, teachers, and classes that engages students in further investigation and action, and in exploration of environmental justice issues.

API Forward is also working with a long-time teacher to refine its classroom curriculum and is developing a train-the-trainer program to expand its reach.

The program was developed following the North American Association for Environmental Education's (NAAEE's) [Guidelines for Excellence](#). Key aspects of the program include:

- **Connection to students' everyday lives.** Workshops started with a community mapping activity in which students mapped their favorite places to spend time at school and in the neighborhood. They also mapped where they thought the healthiest and unhealthiest air was on campus. Students read local news articles about air pollution and research about its health effects, and discussed how pollution affects schools and residents in low-income communities. API Forward staff developed a two-page fact sheet about the movement of goods from Southern California to markets across the United States, and its effect on air pollution. They helped students reflect on how individual and societal consumption can contribute to air pollution.

- **Hands-on investigation in an expanded learning environment.** After learning about particulate pollution in their community, students used the portable sensors to measure indoor and outdoor air quality in their school, on the campus, and in the surrounding neighborhoods. During the investigation, students collected data from the sensors and took photos using smartphones. Student teams uploaded this information to the [Kids Making Sense](#) interactive mapping website, and used the site to help them interpret their findings.

For students, seeing data in the visual context of a map makes all the difference. Over time, we hope to create a global data network so students can learn about air quality in different parts of the world.

—Alan Chan, Sonoma Technology, Inc.

- **Learner-centered instruction.** The air quality workshops encouraged students to build on previous knowledge as they learned about air pollution and its health effects. For example, the students used their understanding of the community to identify where residents might be most exposed to air pollution. API Forward has also encouraged students to ask questions, hypothesize, and think about creative solutions to address air pollution. For example,
 - Students from Mark Keppel High School compared air quality in the nearby San Gabriel Mountains and at their school, discovering that particulate pollution around campus—even inside the school building—was much greater than outdoors in the Angeles National Forest 90 minutes away.
 - Students in a northern California high school who had use of air quality sensors for three weeks as part of the Kids Making Sense program hypothesized that particulate pollution would be worst in front of the school, which faced a major road. However, using the portable sensors, students discovered that pollution was worst behind the school where buses idled while parked.

- **Skill-building and personal and civic responsibility.** Students in API Forward’s workshops developed and practiced skills for analyzing and investigating environmental issues. During API Forward’s engagement with student groups, young people have applied skills in decision-making and civic engagement in a variety of ways. These have included informing local elected officials about air quality issues, making videos to raise awareness at their schools, and working with school administrators to take action on improving campus air quality.
- **Connection to educational standards.** The Kids Making Sense curriculum is linked to national science standards, making it easy to integrate the workshop and extended engagement into established curricula. Together with Sonoma Technology, Inc., the company that developed the Kids Making Sense curriculum and website, API Forward is consulting with educators to help make curriculum changes and teacher workshops compelling and relevant to teachers.
- **A broad network of collaborators.** To develop and implement its approach to engaging students in hands-on learning about air quality and the link to health issues, API Forward worked with a variety of partners (see below).

| Collaborators | Role |
|---|--|
| <ul style="list-style-type: none"> • Sonoma Technology Inc., a California-based environmental technology and consulting firm • HabitatMap, a nonprofit environmental health advocacy organization | <ul style="list-style-type: none"> • Sonoma Tech piloted tested its curriculum during API Forward’s workshops with young people and educators. API Forward adapted the curriculum to meet local needs. • Developed the Kids Making Sense standards-based curriculum, low-cost air quality sensors, and data-mapping website that API Forward used as the basis of its workshops. |
| <ul style="list-style-type: none"> • Air quality researchers and experts at the South Coast Air Quality Management District, the Southern California Environmental Health Sciences Center at the University of Southern California, and Occidental College | <ul style="list-style-type: none"> • Contributed expertise for curriculum enhancements. |
| <ul style="list-style-type: none"> • The International Environmental Partnership | <ul style="list-style-type: none"> • Provides ongoing funding and project support. Through this relationship, API Forward has traveled to Taiwan and Thailand, connecting California students with students in those countries around air quality and environmental justice. |
| <ul style="list-style-type: none"> • North American Association for Environmental Education (NAAEE) | <ul style="list-style-type: none"> • Offers technical assistance as part of the Global Environmental Education Partnership |
| <ul style="list-style-type: none"> • Local schools and teachers | <ul style="list-style-type: none"> • Arranged for workshops either with specific grade levels or relevant classes such as AP Environmental Science |
| <ul style="list-style-type: none"> • Community groups including Asian Americans Advancing Justice, Asian Pacific Policy and Planning Council, San Gabriel Mountains Forever, and Educated Men with Meaningful Messages | <ul style="list-style-type: none"> • Assisted in organizing workshops |
| <ul style="list-style-type: none"> • Local journalists | <ul style="list-style-type: none"> • Attended some of the workshops in conjunction with coverage of larger air quality issues in the Los Angeles basin. |

Evaluation Plan

To evaluate its programs – including its 1-2 day workshops and its longer-term, customized interaction with school groups – API Forward is adopting a multi-part evaluation plan.

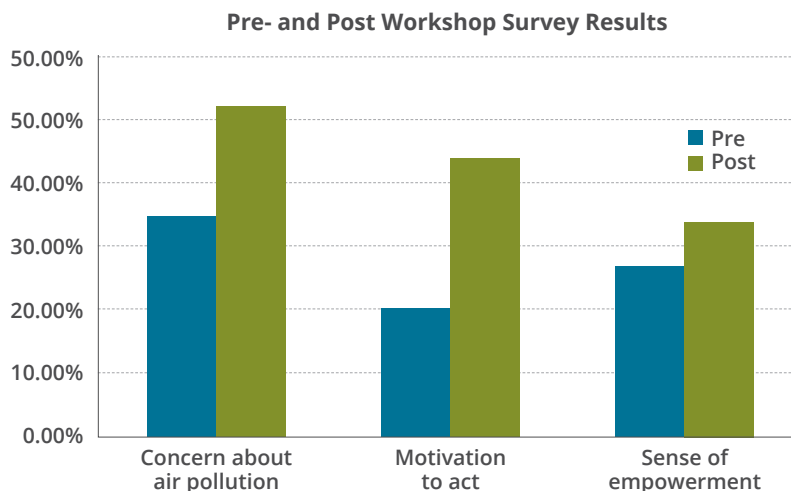
For short-term workshops, formal evaluation has consisted largely of pre- and post-workshop participant surveys. API Forward tested the survey in an early workshop, making revisions to both the workshop curriculum and the survey itself based on responses. Informally, API Forward has drawn on its experiences working with communities, educators, and young people in these workshops to chart its next steps, including plans for longer-term involvement with a small number of schools.

With its longer-term engagement with school groups, such as Mark Keppel High School and Abraham Lincoln High School, API Forward is evaluating its work over the course of the school year. They are conducting pre- and post-tests with students, with post-tests administered several months after completion of programming to help determine longer-term impact of the program. API Forward is also conducting focus groups with teachers, school officials, parents, students, and local elected officials to investigate these key stakeholders’ perspectives on the youth-led air pollution work. These approaches are intended to help program staff identify what worked well and what changes are needed to ensure that the work is sustainable.

Finally, to continuously improve the Kids Making Sense curriculum and website, staff at Sonoma Technology, Inc. are using evaluation data and observations from workshops. Taking an adaptive approach to this work, they see the Kids Making Sense curriculum and website as works in progress.

Outcomes

In evaluating the impacts of its one-and-two-day workshops, API Forward has observed changes for workshop participants in several areas (see Figure 1). Student surveys have revealed a 23 percent increase in knowledge about air pollution and related health effects. At the end of the workshops, more than half of students felt concerned about air pollution (up 17 percent from before the workshops); about a third were inclined to take action (up 14 percent); and about a third felt that they and their peers could make a significant difference (up seven percent).



Students attending the 2016 International Environmental Partnership Kids Making Sense International Opening Ceremony in Bangkok, Thailand

For our community-based organization, some of the best outcomes so far are from building relationships with the U.S. EPA, North American Association for Environmental Education, and other partners. Having this expertise available has helped us round out our program and gain new knowledge.

—Kyle Tsukahira, API Forward

Student survey responses also showed that the workshops had helped them make the connection between air pollution and health. Some students noted that they appreciated learning about ways young people could get involved with organizations that advocate for conservation, health, and equity. Many students indicated a desire for doing similar activities in their communities, learning more about what could be done to reduce air pollution at home and school, and knowing how they could help.

In evaluating the impacts of its longer-term, customized engagement with schools, API Forward staff and participating educators have observed that these programs have increased student awareness of air quality issues on campus, and students helped make connections with other places through the online mapping process. Further, involvement in international partnerships, such as the International Environmental Partnership, has helped students understand air pollution as a global issue. Overall, API Forward has found that building relationships with schools is a valuable way of connecting to communities.

Lessons Learned

Through their work with Los Angeles area students on air quality issues, API Forward has learned to:

- **Connect investigations with a local context.** Background about health, policy, and the local context helped students make connections between the data they collected and their lives and communities.
- **Do your research and ask for help.** Before they started the air quality monitoring workshops, API Forward staff had already developed relationships with local professors studying air quality. Those connections helped staff develop rich, localized resources for students and helped them know where to turn for information about the problem and potential solutions.
- **Be prepared to answer: “What’s next?”** Expanding awareness and knowledge about environmental and social-equity issues often raises questions about how students can learn more, share what they have learned, and get involved in solutions.
- **Get involved in partnerships.** The support of partners has been a major benefit of this work for API Forward, manifesting as technical and program-development advice, peer-to-peer learning, and international exposure. The local and international recognition emerging from these partnerships have provided validation for staff and students alike, and may be one of the most important outcomes of this work, making otherwise unlikely outcomes possible.
- **Use frustrations to drive further learning and new strategies.** When students begin to consider and work on solutions, they may run into unexpected obstacles. Concrete activities like tree planting, advocating for campus air filtration, and receiving grant funding can involve navigating school bureaucracies, local regulations, and other power structures. These can be frustrating, but also present real-world opportunities to learn and adapt.
- **Use short-term workshops to catalyze longer-term engagement.** Especially in public schools, short workshops may be all that schools and teachers can commit to, at least at first. Look for ways to extend this engagement to reinforce learning, expand investigations, and help students address their desire to be involved in solutions. API Forward used what it learned in its early work to shape future efforts, which include experimenting with a multi-year engagement with a student club, summer environmental camps, and developing teacher workshops.

Resources

For more information:

- [API Forward's work with youth and air quality](#) is described on its website.
- [2015 Particulates Matter Workshop highlights video](#) (Youtube): 5:42, Students describe impact of learning about air quality in their area, share facts about air quality, and share potential solutions.
- [Kids Making Sense](#) video
- Video about air pollution in the San Gabriel Valley produced by Mark Keppel High School students

Education Resources:

- [Kids Making Sense](#): Sonoma Technology, Inc. and HabitatMap's air pollution focused curriculum, the basis of API Forward's program. Interested parties can contact Kids Making Sense to participate in the program.
- [Kids Making Sense](#) map: A map of findings from students using the Kids Making Sense curriculum
- NAAEE [Guidelines for Nonformal Environmental Education](#)

Air Quality Resources:

- State of the Air Report: The American Lung Association's annual report includes information about air quality in cities around the country
- [CalEnviroScreen 2.0 Pollution Burden](#): The California Office of Environmental Health Hazard Assessment provides resources on air pollution.
- [Airnow.gov](#): Includes information on air quality for countries around the world and links to resources for states across the country.

Background reading and reports on Kids Making Sense:

- [2014 U.S. EPA report on air quality studies, including Kids Making Sense](#). Highlights other instances of Kids Making Sense curriculum.
- [Kids Making Sense in Taiwan](#)

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