

CASE STUDY

Cultivating a generation of environmental stewards through Civic Science





Setting the stage with impactful partnerships

BACKGROUND

CELf recognizes that children can create an impact through scientific discovery, and with the right tools, can bring data-driven solutions to environmental challenges in their communities.

In 2016, CELf developed the Civic Science: Inquiry to Action framework and its air quality pathway in partnership with Mount Sinai, and has since expanded into other inquiry pathways including water, waste, and biodiversity, supported by the National Geographic Society and Tricon Energy.

In 2022, with grant support from Port Houston, CELf saw an opportunity to grow our educator community by working with Channelview Independent School District (CVISD) alongside the Port of Houston ship channel, which serves 9,500+ students in grades PreK-12 across 11 schools.

Flanked by the San Jacinto Watershed and the Port of Houston Ship Channel, and in proximity to the ship channel's numerous industrial facilities, CVISD students are directly impacted by environmental justice concerns such as exposure to particulate matter, polluted runoff, and flood

risk during extreme weather events. Civic Science offered an opportunity for students to develop academic and environmental stewardship skills by exploring these issues in their own communities.

Working closely with CVISD's District Science Coordinator, Christy Irvin, CELf recruited 3 CVISD teachers to take part in our 2023-24 Civic Science cohort, who applied their learning to facilitate development of students' critical and systems thinking, data collection, and analysis skills, teamwork, and effective communication.

As part of cultivating their Civic Science skills, students engaged with their local ecosystem by studying the Houston Ship Channel, where they learned about the interplay between the environment and the economy by gathering air quality data for projects driven by their environmental concerns.

Students celebrated their environmental stewardship journey and shared their findings during CELf's culminating Student Symposium event, hosted by EDPR at Hess Tower in March 2023.

Year One of Fostering Environmental Stewardship through Civic Science

CELF collaborated with educators from middle and high schools during the 2022/2023 academic year to nurture students' environmental stewardship through place-based civic science programming. This initiative aimed to empower students to address and find solutions for environmental challenges related to air and water quality in their school communities while cultivating skills like critical and systems thinking, data analysis, teamwork, and public speaking. Specifically, the program was targeted at schools situated near the Port of Houston and serving Environmental Justice populations, with an emphasis on those having CTE programs. Based on this recruitment criteria, CELF reached out to CVISD, finding a community of passionate educators interested in taking part in the 2022/2023 program.



CIVIC SCIENCE: INQUIRY TO ACTION FRAMEWORK



STEP 1 | INQUIRY



STEP 2 | DATA COLLECTION



STEP 3 | ANALYSIS



STEP 4 | COLLABORATION



STEP 5 | INNOVATION



STEP 6 | ACTION

"Students are already asking if they can do it again. The learning impact that they gained from the experience was pretty impressive. Once they created that map and could see what is in their community and what is impacting the quality of the air, which is what we focused on, it opened their eyes and made them more aware of what else can be impacting the environment."

Rhonda Perez

**Channelview ISD—Endeavor H.S. at the
Campbell Learning Center**

Year One of Fostering Environmental Stewardship through Civic Science

Leveraging existing partnerships, CELF provided air quality monitoring devices in-kind courtesy of McMacCX, and provided training in January 2023 from CELF and partner Plume Labs to learn how the air quality monitoring devices could be used to capture real-time air quality data. Throughout the program, educators crafted project plans to engage their students in using these GIS tools for mapping their communities and analyzing environmental indicators, such as levels of Particulate Matter 2.5 and volatile organic compounds.

Later that month, CELF helped organize a field trip to the Port of Houston for data collection using portable air quality devices. Thirty-seven students and five teachers from Channelview High School joined the field trip.

“It was really great for the kids to understand the impact that industry actually has on the environment. They were so ready to be up in arms because of how much trash was in the ship channel. They said, “this is not okay. What about the aquatic life?” So they actually were really impacted to take more action outside of the classroom to get involved. They have an environmental club taking environmental sciences in the future for their classes and then even finding ways that they can pick up trash or be involved in community cleanups.”

Octavia Gilshenan

Channelview Highschool (Currently at Sheldon ISD)

Once students had a chance to collect and analyze their data, they collaborated to innovate potential solutions to raise awareness about local air quality. They were invited to share their findings and solution ideas during CELF’s culminating Spring Student Symposium, which took place on March 8, 2023, at Hess Tower in downtown Houston – graciously hosted by EDP Renewables. This event showcased place-based action projects from students representing Channelview High School and Endeavor High School in Channelview Independent School District, Pasadena High School in Pasadena Independent School District, Rio Grande High School in Rio Grande City CISD, and Lewis Middle School in Aldine Independent School District.



Children's
Environmental
Literacy
Foundation

Year One of Fostering Environmental Stewardship through Civic Science

750+

Middle & High School
Students Engaged in
CELf's Civic Science
Programming



Projects from students at 6
schools across 5 Texas districts

13

Student-driven projects
presented by 38 students
across Civic Science
pathways

During this event, students showcased their research discoveries and proposed solutions before a group of experts and decision-makers from local government and industry partners including EDP Renewables, Baker Hughes, Crestwood, Burns and McDonnell, and Jesse Jones Park and Nature Center. Projects explored pathway themes of air, water, food, and waste.

The program's impact fostered students' environmental stewardship by engaging them directly in their place as civic scientists, exposing them to Green Career pathways, and developing their skills essential for ongoing environmental stewardship and civic engagement.



Scaling Year Two of Civic Science

Building upon the established relationships and partnerships from the 2022/2023 school year, CELF's 2023/2024 program will expand the pathway focus from air to water, waste, biodiversity (including phytoremediation), infrastructure, energy, and transportation to help students take a wider view of what their environmental stewardship can encompass.

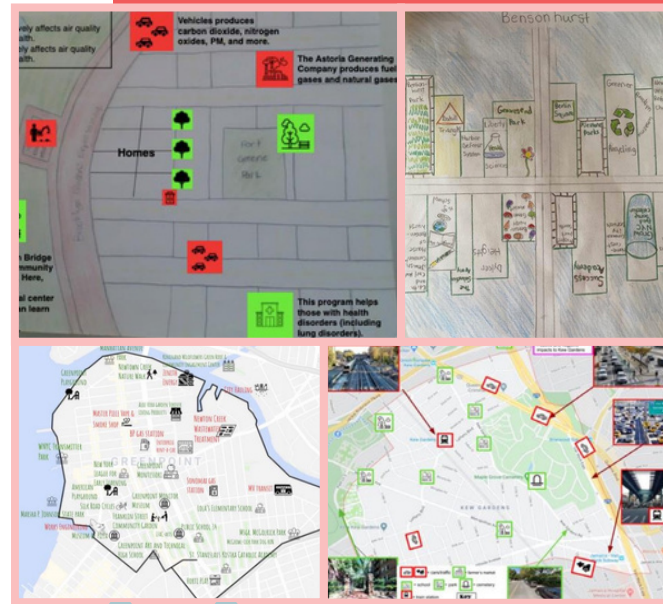
Drawing from the Civic Science Inquiry to Action framework, students will utilize their training in scientific research, data analysis, and public engagement to collect data that they can eventually share with fellow students and educators across the nation. This sharing will be particularly aimed at Texas, New York, California, Pennsylvania, Tennessee, and West Virginia, fostering a collaborative approach to addressing environmental challenges.

In the second year, CELF will facilitate Student Exchange opportunities on both national and international platforms, with potential connections extending to classes in Ghana. These exchanges will serve as a collaborative element of project development, promoting global awareness and cross-cultural understanding, thus enriching the students' perspectives.

CELF's commitment to supporting teachers will remain steadfast throughout the year, offering continuous assistance through virtual sessions that delve into community mapping, data analysis, and digital storytelling. Additionally, financial backing will be provided in the form of project microgrants and teacher stipends upon the program's completion.

To nurture the development of essential skills in the context of environmental stewardship, students will be afforded the chance to collaborate with scientists, engineers, and other professionals. Through these interactions, they will gain insights into potential career paths while acquiring the skills needed to excel in fields aligned with their project focuses.

The CELF team strives to foster environmental stewardship in students to not only benefit the environment but also to empower them to become informed, responsible, and compassionate citizens who contribute positively to society and the planet.



“You always think about empowering your students. And then for them to actually have the opportunity to have adults see what they're doing and take them seriously and give them feedback and them coming out of that and being able to say that they've had the experience of walking into a room and having adults listen to them and them commanding what they're presenting is one of those experiences that, especially in the type of district that we're in and the kind of students that we have, they rarely ever get to have those opportunities. And so it just sets them up for success and to have those experiences that other kids were blessed to have because of whatever area they came from. How many times do we really have the opportunity to give that to our students?”

Erica Villareal
Science Teacher
Channelview Highschool