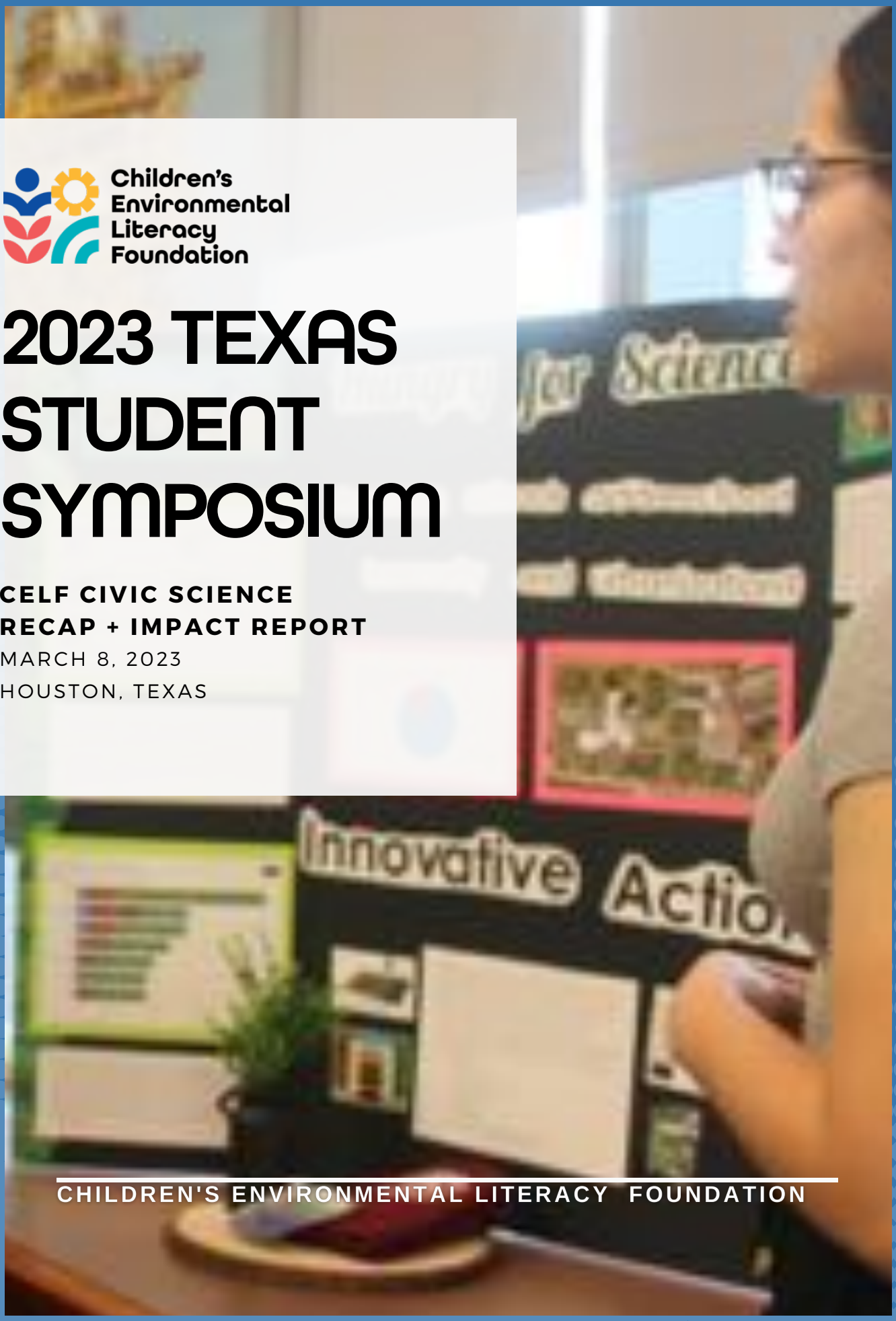
Children's Environmental Literacy Foundation

2023 TEXAS STUDENT SYMPOSIUM

CELF CIVIC SCIENCE RECAP + IMPACT REPORT

MARCH 8, 2023

HOUSTON, TEXAS



CHILDREN'S ENVIRONMENTAL LITERACY FOUNDATION

The Student Symposium is a culminating event from CELF's Civic Science: Inquiry to Action program which engages students in hands-on learning to identify, analyze, and solve real-world environmental issues that impact their schools, neighborhoods, and beyond.

CELF's Student Symposium brings young civic scientists together to share their research projects, data, and solutions for pollution remediation and environmental stewardship with community members, field experts, policymakers, and peers being the primary audiences.

By navigating the connection between science, society, and policy, children are empowered to make a positive impact on our world. Led by classroom teachers trained and supported by CELF, students are transformed into vital global citizens, ready to face tomorrow’s challenges head-on.

On March 8, 2023, CELF Texas held its first in-person Student Symposium event where students in the Civic Science program presented place-based action projects. The event was hosted by EDP Renewables at Hess Tower in downtown Houston.

CHILDREN'S ENVIRONMENTAL LITERACY FOUNDATION

CIVIC SCIENCE: INQUIRY TO ACTION FRAMEWORK

STEP 1 | INQUIRY

Students connect to their place (i.e. campus, classroom, or community) through the development of an **inquiry** question related to an environmental issue they can investigate.

STEP 2 | DATA COLLECTION

Students gather information to support their inquiry question. **Data** will be qualitative and/or quantitative, and collected using devices, technology, tools, surveys, photos, maps, observations, etc.

STEP 3 | ANALYSIS

Students **analyze** trends, patterns, and evidence from the data collected. They formulate a solution to the problem, and determine the environmental, economic, and equity implications.

STEP 4 | COLLABORATION

Students **collaborate** to discuss their findings, share ideas, perspectives, and determine next steps. If they answered the inquiry question, students move to the next step. If not, they identify what additional information is needed and how to address any information gaps.

STEP 5 | INNOVATION

Students collectively use **innovation** and creativity to construct a solution to the inquiry problem. In addition, they devise a remediation plan and decide how best to present their data-based findings and plans to others.

STEP 6 | ACTION

Students create change in their community through awareness, empowerment and civic **action** by presenting their findings to an authentic audience composed of decision-makers and field experts.

BUILDING ENVIRONMENTAL LITERACY THROUGH CIVICS

STUDENT LEARNING EXPERIENCES

During the 2022/23 school year, CELF provided students with numerous opportunities for discovery and inspiration with programs to complement their Civic Science experience.

Civic Science Introduction

CELF educators joined teachers and students in their classrooms to introduce the core concepts of Civic Science, including the Big Ideas of Sustainability and driving questions. Students used this time to start imagining their final projects.

Green Experiences

Whether exploring the Houston Ship Channel from a boat, cleaning up the Willow Waterhole Greenway, or identifying species in the wild, students got to see how much of a difference they can make in their local environment.

Data Capture

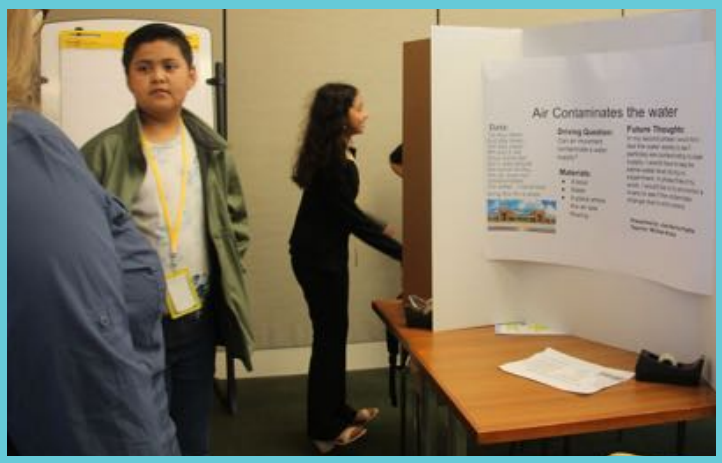
Using air quality monitors and other technologies, students transformed their outdoor experiences into scientific data gathering for analysis back at school.

Green Careers Speakers

The Green Careers speaker series connects teachers and students with field experts and scientists who enrich the classroom experience by adding real-world exposure and career connection during presentations and Q&A sessions.

© 2023 Children's Environmental Literacy Foundation. All rights reserved.
Not for reproduction, transmission, or distribution without the prior written consent of Children's Environmental Literacy Foundation.

CTE High School Students Evaluate Air Quality Along the Houston Ship Channel



PROJECTS OVERVIEW

Channelview ISD and Pasadena ISD students evaluated air quality along the Houston Ship Channel. Teachers and students received training in air quality monitoring techniques and used specialized equipment to collect data on various pollutants such as particulate matter (PM 2.5) and volatile organic compounds (VOCs).

Their varying projects provided valuable information about surrounding air quality, as students identified potential environmental health hazards directly connected to air quality. Their projects promoted scientific literacy among Career and Technical Education (CTE) students and also encouraged active participation in addressing real-world environmental issues.

STUDENT ACTION STEPS:

- Channelview ISD students will connect with a campus in Ghana through CELF's Student Exchange program where students from each campus share an overview of their air quality projects along with exchanging data analysis
- The teachers from this cohort are extending these student projects into the next academic year to evaluate the connection between water and air quality along the ship channel

© 2023 Children's Environmental Literacy Foundation. All rights reserved.
Not for reproduction, transmission, or distribution without the prior written consent of Children's Environmental Literacy Foundation.

Investigation of Water Quality in the Rio Grande River Continues in Second Year

PROJECT OVERVIEW

The student group from Rio Grande City CSD traveled over 350 miles to share their second year of data at the Student Symposium. The project involves collecting water samples from three water sources connected to the Rio Grande River - which serves as a vital source of water for communities in both the US and Mexico.

Through this project, students regularly investigate the water quality of their local watershed along the Rio Grande River. The samples are analyzed several times a year to assess the water quality, as well as to identify any pollutants that may be present. They collect water samples from three different locations in the vicinity of Rio Grande City and conduct standard tests to assess and track the turbidity, acidity, salinity, oxygen levels, and bacteria content of the samples.

STUDENT ACTION STEPS:

- Due to the discovery of fecal coliform bacteria at all three sampling sites, students are focused on raising public awareness about this community issue and are looking to present their water findings to their local city council
- These students and teachers are actively fundraising and applying for financial support to ensure the continuation of this campus project. The current lack of resources poses a significant limit on fostering the longevity of the project and the innovation among students

© 2023 Children's Environmental Literacy Foundation. All rights reserved.
Not for reproduction, transmission, or distribution without the prior written consent of Children's Environmental Literacy Foundation.

Students Rethink Local Food Systems with Hydroponics, Vertical Gardens and Food Closets

PROJECTS OVERVIEW

This academic year, three campuses from different districts throughout the Greater Houston Area shared projects focused on rethinking local food systems with hydroponics, vertical gardens, and food closets to address food insecurity and waste issues in their communities.

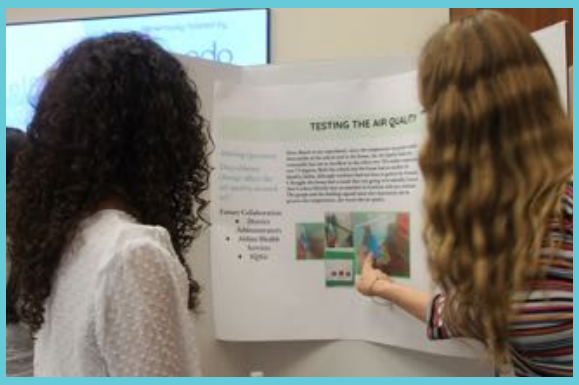
In partnership with Houston-based hydroponics supplier Moonflower Farms, students are implementing alternative methods of growing produce in urbanized areas with limited space. Students are exploring the feasibility of implementing these methods in their schools to increase access to fresh produce for entire campus populations. Other projects have students working to establish and maintain food closets in their community, as a broader systemic way to address food insecurity.

STUDENT ACTION STEPS:

- Students from Shadow Creek High School are actively working with other campuses in the Greater Houston Area to provide access to hydroponic systems
- Students are exploring the feasibility of implementing hydroponics systems to regularly increase access to fresh produce for entire campus populations

© 2023 Children's Environmental Literacy Foundation. All rights reserved.
Not for reproduction, transmission, or distribution without the prior written consent of Children's Environmental Literacy Foundation.

Students Inspect Indoor Air Quality on Campuses



PROJECTS OVERVIEW

With access to air quality devices - such as the AirBeam and Flow - middle and high school students examined different factors influencing indoor air quality on their school campuses. These projects allow students to consider the interconnection between indoor and outdoor air along with the different contributing factors to air quality.

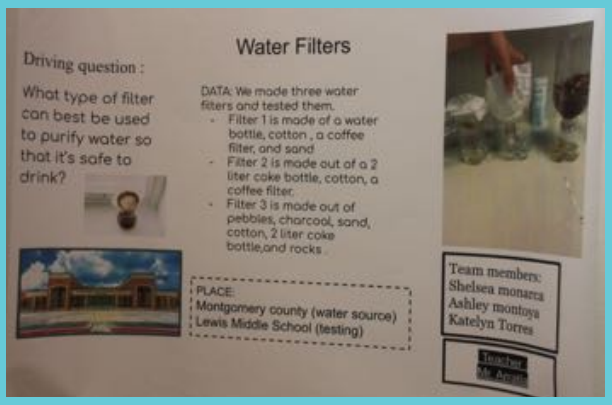
One group of students focused on the impact of school-provided and commercially acquired hand sanitizers; another examined the air quality and developmental health effects of high school welding programs; while a third investigated the influence of an idling bus fleet at the entrance of the school.

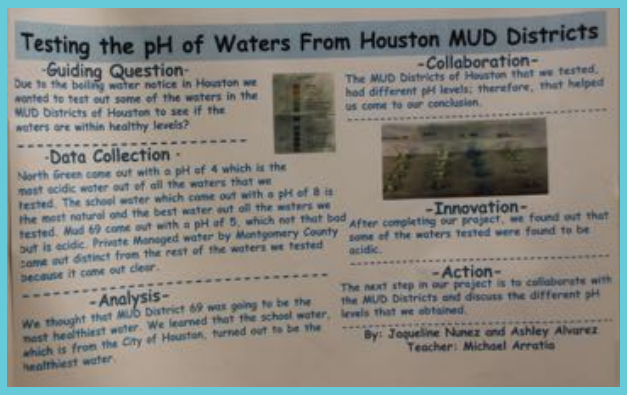
STUDENT ACTION STEPS:

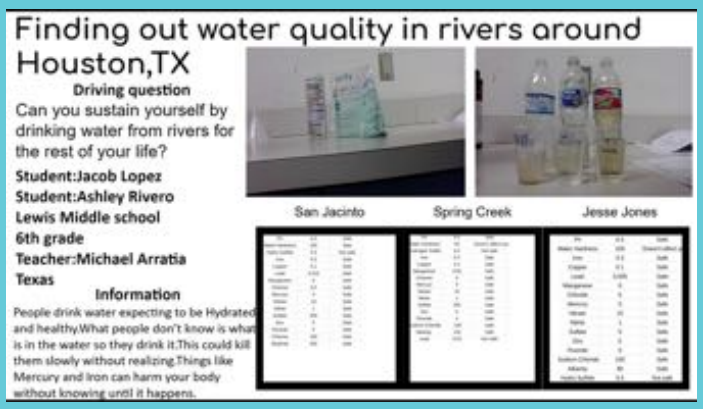
- For Endeavor HS, this indoor project is being implemented as a legacy project - graduating students are establishing parameters and providing a structure of longevity for the next wave of students inheriting this project
- For the other campuses, the air quality project findings are being used to petition campus administrations, district-level decision-makers, and school boards to reconsider the purchasing of soaps and hand sanitizers containing chemicals that could negatively impact the health and safety of students

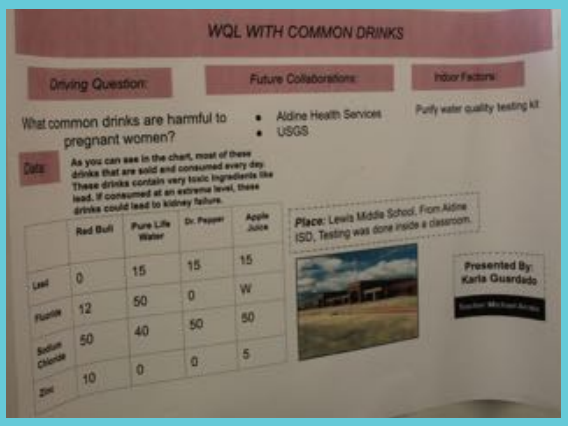
© 2023 Children's Environmental Literacy Foundation. All rights reserved.
Not for reproduction, transmission, or distribution without the prior written consent of Children's Environmental Literacy Foundation.

Middle School Students Explore Houston's Water Quality









PROJECTS OVERVIEW

At Lewis Middle School, a teacher and frequent CELF program participant led his students through projects aimed at understanding Houston's water quality. Their projects centered around the efficacy of using water filters and testing the pH of waters from different Houston water suppliers to explore the water quality in the region's rivers.

In these projects, students conducted research on the importance of water quality and evaluated the factors that affect it - including the presence of pollutants, contaminants, and pH levels. Project research included the sources of water in Houston, including rivers, reservoirs, and groundwater. Students evaluated water put through filters to test the pH of water from Houston MUD (Municipal Utility District) districts. MUD districts are independent governmental entities that provide water, sewer, and other utility services to residents within their boundaries. By testing the pH levels of water from different MUD districts, students compared and contrasted the quality of water in different areas of Houston.

STUDENT ACTION STEPS:

- At CELF's 2023 Summer Institute, the teacher leading this project will model multi-year Civic Science projects for other teachers
- The teacher is planning to lead students in collecting water samples from different rivers around Houston, such as the Buffalo Bayou and the Brazos River
- Students will use the water sample results to present to Harris County Water Control and Improvement Districts, as well as the United States Geological Survey

© 2023 Children's Environmental Literacy Foundation. All rights reserved.
Not for reproduction, transmission, or distribution without the prior written consent of Children's Environmental Literacy Foundation.

2022/2023 Texas Civic Science Metrics

750+

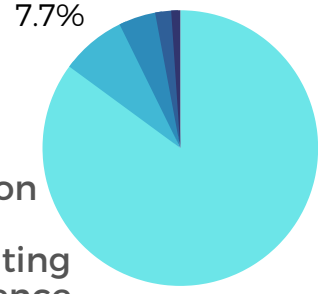
Middle & High School Students Engaged in CELF's Civic Science Programming

Projects from students at **6** schools across **5** Texas districts

13

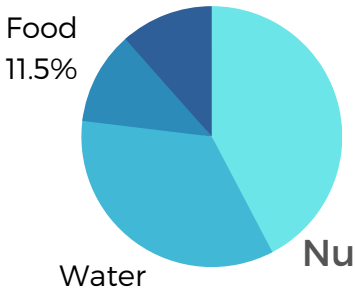
Student-driven projects presented by 38 students across Civic Science pathways

Diverse student population across participating Civic Science Schools



100%

Title 1 Schools in this Civic Science cohort



Numerous project pathways

SYMPOSIUM PARTNERS & SPONSORS

© 2023 Children's Environmental Literacy Foundation. All rights reserved.
Not for reproduction, transmission, or distribution without the prior written consent of Children's Environmental Literacy Foundation.

LOOKING FORWARD

Are you interested in bringing Civic Science and a Student Symposium to your school, district or community?

Contact CELF about bringing Civic Science and its related programs to students in your community.

Each year, Civic Science grows with more **multi-year projects and innovative pathways**, CELF's 2023-24 program will include a pathway focus on water quality, watershed health and coastal resilience.

At CELF, we look ahead to deepening relationships with schools and partners, including Port Houston support of student research on the Houston Ship Channel.

With immense gratitude to everyone who helped make this day a success!

Children's Environmental Literacy Foundation

CELF New York: 100 Summit Lake Dr., Suite 160, Valhalla, NY 10595 P: 914.449.6868
CELF Texas: Houston, TX P: 832.477.4583
www.celfeducation.org