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# IT TAKES A VILLAGE

## BROADENING MINORITY PARTICIPATION IN THE UNDERWATER SCIENCES THROUGH COLLABORATIVE COMMUNITY PARTNERSHIPS

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**OCEAN LITERACY IS IMPORTANT** for the public to make informed decisions about ocean restoration efforts and to take increased individual responsibility in those efforts. Younger generations are crucial for developing an ocean literate society, but adequate ocean science education is a challenge for underserved and underfunded schools.

A 2009 survey by the Ocean Project revealed that young people care greatly about ocean conservation, are motivated to act and often influence adults' opinions. Informal educational opportunities run by the Black Girls Dive Foundation (BGDF) — such as our STREAMS (science, technology, robotics, engineering, arts, mathematics and scuba) program and collaborative partnerships with aquariums such as the Georgia Aquarium — fill the knowledge gap and are a resource for environmentally minded students.

One of our goals is to offer the water engagement that's integral for marine sciences, a college major that typically has low interest in the Black community, especially among women. We believe this lack of interest is embedded in Black cultural history's multigenerational narrative that Black people do not swim or engage in water activities. Hair texture and management are also

salient factors; many Black women make a conscious decision to avoid exploring the water and getting their hair wet. A symptom of past discrimination and segregation, this behavior has led to swimming not being a part of African American recreational culture.

Seventy percent of African Americans do not know how to swim, and research shows that children have more than an 80 percent chance of not learning to swim if their parents don't swim. This lack of water activity may explain why Black children are five times more likely to drown than white children. Changing this cultural narrative through outreach and opportunity could increase Black girls' interest in aquatic-based programs in science, technology, engineering and math (STEM) fields and careers in the underwater sciences.

BGDF is a nonprofit organization founded in 2017 to empower girls from historically underrepresented minority groups to explore their STEM identities through marine conservation activities and aquatic-based recreation such as diving. We currently serve underserved girls in Baltimore, Maryland, and the surrounding counties as well as Trenton, New Jersey. Through a collaborative partnership with the Georgia Aquarium, we will soon launch a pilot program in Atlanta.

Students are ready to make the Journey with Gentle Giants dive at the Georgia Aquarium.  
*Opposite:* BGDF scholars clean coral at the coral nursery with the Coral Restoration Foundation.

The foundation has had an impact on more than 300 youth nationally and internationally and has a program retention rate of more than 90 percent. We have provided more than 200 STEM classes, issued more than 60 traditional and specialty dive certifications and led two international dive expeditions to Sharm el-Sheikh, Egypt, and Andros Island, Bahamas. These capstones have provided BGDF scholars an opportunity to apply what they've learned by completing an environmental stewardship project. Students explored the ocean using surveying techniques to document biodiversity, for example, and did a comparative analysis on the differences between oceanic and freshwater blue holes and buoyancy differences in the Red Sea versus the Atlantic Ocean.

The STREAMS program addresses the racial, gender and socioeconomic achievement gap that undermines our ideals of freedom, equality and opportunity and how we cultivate the next generation of scientists and planetary stewards. This aquatic-based eco-STEM program integrates science, technology, robotics, engineering, arts and mathematics with scuba diving and marine conservation projects. It is conceptually grounded in STEM identity research that views Black women's interest in science through a lens of science identity.

Gender, racial and ethnic identities affect people's science identity, which is the summation of their competence, performance and recognition by meaningful others as a science person. Visual images of scientists historically have been of white men in lab coats, which may hinder Black and Latina girls from imagining themselves as scientists. Studies have shown that a failure to identify with the dominant culture's images of scientists is linked with lower interest and pursuit of learning in math and science among middle-school girls, which can ultimately affect their career choices. STREAMS provides an opportunity for girls to see people who come from their cultural and racial background and who look like them in marine science and aquatic recreation spaces.

STREAMS launched Project CORAL (Collaborative Ocean Restoration and Leadership) in 2020 to address the critical issue of coral reef destruction and its global impact. The project plays an essential role in educating youth to act by actively engaging in coral reef restoration. Students use 3D printing to design, fabricate and plant coral segments onto reefs. They also engage in stream, beach and ocean debris cleanup to support healthy waterways.

This project's objective is to support critical inquiry and thinking, communication, collaboration and responsible citizenry while meeting national science standards and



cultivating the STEM identities of girls historically identified as an underrepresented “minority” group. This work increases girls' interest in STEM, provides career exploration and knowledge of complementary career fields and their academic pathways, and produces the next generation of youth eco-leaders to tackle environmental issues of climate change and healthy waterways.

In addition to their science work, students receive dive training, complete a scuba certification course and learn about the principles and techniques of scientific diving. They also learn how to capture 360-degree underwater images and video and the process of photo stitching. They utilize remotely operated vehicles (ROVs) to monitor and capture additional video footage in areas divers can't reach.

STREAMS cultivates learning using a place- and project-based learning approach to enable deeper, more meaningful and authentic learning. Research-informed practices illustrate that there is power in place-based education, and leveraging that power creates authentic and organic experiences that are transformational for youth. The program is a collaborative effort with the Georgia Aquarium, Sprout U School of the Arts, Hope-3D, U.S. Distance Learning Association, Khaled bin Sultan Living Ocean Foundation, Charm City Chapter of the National Association of Black Scuba Divers, National University of Samoa and Forfar Field Station.

BGDF is uniquely positioned to expand its reach and provide opportunities for girls across the country to build peer relationships and leadership skills and explore their STEM identities through mentorship and place- and project-based learning. The key component to actualizing this goal is expanding our partnerships and collaborations with various organizations and businesses such as dive shops, community centers, schools, community colleges and universities.

It takes a village to prepare our youth to be productive citizens, and these collaborative partnerships are vital to the success of our organizational mission and program. With the help of our generous partners, we will continue to support the young, environmentally conscious Black girls who are building their futures full of possibilities. **AD**