

Policy-Ready Citizen Science

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Population

The target audience is Portsmouth Public Schools (PPS) students, teachers, parents, and administrators. PPS is a large economically and racially diverse, high-needs, urban school division located in the Hampton Roads area of southeast Virginia. The division serves approximately 14,879 students. 75% of all students in the division are Black. Many of these students face considerable challenges. For example, over half are economically disadvantaged as evidenced by their eligibility for free or reduced lunch. Additionally, there exists a considerable achievement gap between Black and White students in both Science and Math, with Black students historically scoring lower on standardized end of year tests. This has negative implications for increasing the number of students from underrepresented populations who go into marine-related fields.



Figures 1-4. Teacher professional development sessions during summers provide content, technical, and pedagogical background to implement citizen science projects with their students.

Goals and Objectives

Policy-Ready Citizen Science Goals

Policy-Ready Citizen Science is designed to enhance (a) the environmental literacy of children and adults, particularly with respect to their local environment in the Chesapeake Bay watershed and connections to global climate change issues and (b) the development of a "world-class workforce" by providing access to STEM-related careers for underrepresented populations and for those interested in 'non-traditional' STEM workforce careers (e.g. lawyers, software developers, journalists, etc.) (NOAA Education Strategic Plan).

Policy-Ready Citizen Science Objectives

Objective A: Enhance urban teachers', students', and parents' STEM literacy with an emphasis on their relationship with the Chesapeake Bay system

Objective B: Increase interest of underrepresented populations in STEM fields

Objective C: Need to enhance American competitiveness by increasing students' abilities to design and build solutions to authentic STEM challenges

Objective D: Increase teachers' knowledge and use of technology-enhanced, inquiry-based instructional strategies

Objective E: Enhance students', parents', and teachers' environmentally responsible behaviors

Policy-Ready Citizen Science Outcomes

Outcome A: Teachers', students', and parents' understandings of STEM content and the Chesapeake Bay system will improve

Outcome B: Participants' interest in STEM issues and careers, specifically those regarding the Chesapeake Bay system, will increase

Outcome C: Students' understandings of STEM, specifically of design processes, will increase and students will effectively use technology to answer questions and solve problems

Outcome D: Teachers will increasingly make use of instructional technologies (e.g. online real-time data, GPS/GIS, probeware, CTD meter) and inquiry-based pedagogy over the course of the project

Outcome E: Students, parents, and teachers will increasingly engage in environmentally responsible behaviors.

The "Policy-Ready" Part

The project contributes to greater understanding and stewardship of the Bay by accomplishing Outcomes A-E. In addition to the project participants forming more complete and appropriate understandings of environmental science, the Chesapeake Bay, and design processes, the data they collect with their observation buoys and the associated findings will be made publicly available. Unlike many citizen science projects, the data that Policy-Ready Citizen Science participants will gather will be 'Level III' data collected using YSI instruments that communicate wirelessly in real-time to a variety of entities including public schools, non-governmental organizations (NGO's), and government agencies. This is a proven process that has been vetted and approved by the Virginia Department of Environmental Quality. These data are then used in policy-making processes at the state and federal level regarding the Chesapeake Bay. This means that students, parents, and teachers are not just doing a school science activity, but instead are engaged in authentic, meaningful scientific inquiry in their own neighborhoods that could improve their quality of life and the Chesapeake Bay.

Citizen Science Deliverables

Policy-Ready Citizen Science Projects and Tools

Autonomous Underwater Vehicles (AUV) were constructed using the Seaglide platform. Teachers used the AUVs as tools to engage students in potential citizen science efforts. These efforts revolved around physical water quality data collection in the Elizabeth River in Virginia.



Remote Operated Vehicles (ROV) will be constructed using the Aquabotz platform (Dr. Doug Levin). This work will occur during Summer 2016.



Drones will be constructed in Year 3 of the project. We are currently exploring various platforms.

