Project Name: Vero Beach Elementary Student Scientists Help Save the Indian River Lagoon

Project Information: We are seeking funding to help our water filter STEM elective for fifth graders at Vero Beach Elementary. These students have chosen to participate in an engineering project to design a water filter to help the Indian River Lagoon. We have partnered with Port St. Lucie Utilities, the Clean Water Coalition, Indian River Stormwater Division, and the Audubon Society to give our students access to experts and resources to research water quality and various forms of filtration systems. This project supports Vero Beach Elementary's Project Based Learning School designation, and our students will be entering their completed projects in the Indian River County Science and Engineering Fair. In order to execute the engineering process, we need support for the necessary equipment to research, build, and test the designs the students create. More specifically, we need water test kits, microscopes, student safety equipment, materials to collect and store water samples, and materials to build the filters.

How the Project Aligns with SDIRC Strategic Plan and/or the School Improvement Plan: The third goal in the Vero Beach Elementary School Improvement Plan is school-wide participation in the Buck Institute Gold Model of Project-Based Learning. This STEM challenge directly supports this initiative. The design elements of Project Based Learning are strongly linked with student motivation and engagement to increase achievement. Students who participate in our water filter STEM elective must engage in significant research, design, build, and reflect on their prototypes and will become better stewards of our community's most precious resource.

The water filter STEM task also aligns with multiple focus areas in the SDIRC Strategy Plan. Specifically, students will have access to high-quality and equitable learning opportunities that demonstrate the urgency for scientific knowledge and innovation in our community. The class represents an equitable and inclusive learning environment, as the students represent a variety of races, social-economic backgrounds, and learning abilities. Finally, we are building community relationships by establishing partnerships with Port St. Lucie Utilities, the Clean Water Coalition, Indian River Stormwater Division, and the Audubon Society. Their volunteers are providing hands-on, authentic learning opportunities and expert support during our design process. We have also reached out to the Environmental Learning Center and Harbor Branch, so more community ties may be forthcoming.

Amount Requested: $2,100 Total Project Cost: $2,101

Targeted Population: Vero Beach Elementary is in Vero Beach, FL. It serves students in Pre-K-fifth grade. According to the US News and World Report, VBE has a population of 622 students. Of that, 58% are minority students and 81% are economically disadvantaged.

Number of Children to be Served: This school year, we intend to serve 12 fifth graders. Of the group currently enrolled in the elective, we have often under-represented populations in science. One-third of the elective is female; 67% are ethnically diverse, 20% have a specific learning disability and 30% have learned English as a second language. Our goal is to make the water filtration elective sustainable so future fifth grade students can also participate.

Succinct Summary:

- **The Issue-** Currently, VBE has low achievement scores as measured by FSA. In 2020, only 22% of our fifth graders were proficient in science and 25% were proficient in reading. As

described in our School Improvement Plan, "Vero Beach Elementary is a Project Based Learning School. Research shows that students participating in the Buck Institute Gold Model outperformed their peers in reading growth and proficiency. In our VBE cohort, students who were in an identified PBL cohort were three times more likely to be proficient in reading than peers in a traditional instructional model (Gil, 2019). Data from this same school report, showed all students in a PBL settings outperformed their peers on I-Ready diagnostic assessments. The subgroup that outperformed all others on this same measure, was Black/African American (by 66 scale points)." This grant will allow students to participate in an authentic PBL design process that could improve their achievement scores and help remove phosphorus and nitrates from the Indian River Lagoon. In addition, it will help establish the next generation of environments for our community.

- **The Change-** As a result of this grant, we intend to see passionate, well-informed student-scientists and water filter prototypes that can successfully remove unwanted contaminants from test water. Students who participate in the STEM elective would also show increased achievement on state reading and science tests.
- **The Action-** First, students will research general information about water, such as water sources, the water cycle, the composition of water, and what is in various bodies of water in our community. Then, we will work toward understanding water quality; specifically, how scientists test for water quality and how to read water quality reports. We then plan to learn about different methods of filtration and filtration systems. Finally, we plan on building, testing, and revising prototypes of water filters that will ultimately separate unwanted phosphorus and nitrates from brackish water.

Grant oversight: Katelyn O'Neal -VBE Librarian & Lyndsey Matheny- VBE principal

Monitoring Progress and Results- Progress will be monitored using photojournalism and scientific journaling methods taught by the Audubon Society. We will present our projects at the Science and Engineering Fair and monitor student achievement scores on FSA.

Volunteers- This project provides ample opportunities for volunteers. We are open to any scientists or engineers who are willing to support our design process. The class meets daily from 8:50-9:30 and we happily ensure flexibility to accommodate any day an expert could spend with us. We plan on building the prototypes in November, so help around then would be greatly appreciated.

Itemized Budget

10 LaMott Water Test Kits	$58/each	$576
5 Water/Air Thermometers	$10/each	$50
2 Electronic Microscopes	$290/each	$580
Safety Equipment (Wellies and gloves)	$25/each	$300
2 Survey Tape Measurers	$15/each	$30
6 Sets of Transport and Storage Equipment	$12.50/each	$75
2 Seine Nets and PVC pipes	$20/each	$40
6 Sets of Filter Building Materials	$75/each	$450