

Project title: Clean Up Crew: Empowering Our Future Changemakers

Project focus area: Marine Debris

Project abstract:

Our elementary school seeks to educate students on marine debris and its impact on beaches and marine life. Educating students will include stewardship, outreach, and exposure to STEM careers. “Clean Up Crew: Empowering Future Changemakers” will take elementary students to area beaches to remove up to 1,500 pounds of marine debris. We will also collect data on single-use plastics used in our cafeteria and lunch boxes. Students will then use plastics collected to engineer and create a trash art to share as outreach in our community. Throughout this project, students will apply STEM principles to address marine debris through personal and civic action within our school and community.

What environmental issue will your project address?

The focus of our project, “Clean Up Crew: Empowering Future Changemakers,” is marine debris education, stewardship, outreach, and STEM careers for elementary students in grades K-5. This project will impact 600 students and reach many more as we communicate and share our project with families and our community. Our elementary school is situated a few miles from the Gulf of Mexico, which provides the unique opportunity for students to engage in learning experiences that connect with the local environmental issues. Bays, lagoons, and the Gulf of Mexico surround our community. Students can see first-hand the impact of marine debris.

Marine debris education, stewardship, and outreach are essential for young learners. As coastal community residents, we witness first-hand the impact of derelict fishing gear, single-use plastics, and abandoned recreational equipment on our beaches and waterways. It is not uncommon to see sand toys, water bottles, beach chairs, and tents left on the beach after a busy summer weekend. This debris damages our sensitive coastal and marine ecosystems, from the smallest microscopic organisms to larger animals like sharks, whales, and sea turtles (NOAA 2021). Tourism, education, the military, and manufacturing are pillars of our local economy. We are also growing at twice the national average rate, with 180,000 residents in our county (BDA 2021). The pressure placed on our sensitive marine ecosystems is immense, and this is the time to create meaningful educational and stewardship opportunities for our young learners and future changemakers.

“People protect what they love” (Jacques Cousteau). For young children, their world includes home, school, the backyard, and the playground. At this stage, it is essential to foster empathy and encourage exploration of their environment (Shedd Aquarium 2017). Our backyard and our playgrounds are the Gulf of Mexico and the surrounding waterways. Our students need learning experiences that reach beyond the classroom, allowing them to learn about local biodiversity enabling them to develop a lifelong love and understanding of the environment that surrounds them. Encouraging young learners to develop a deep love for the wildlife and ecosystems surrounding them will empower them to make choices that protect and preserve our precious resources.

The impetus for this project stems from our experience with a program funded by NOAA for educational outreach about marine debris. In the fall of 2020, our students attended a virtual field trip with 2TC Turtle Trash Collectors. The virtual experiences included a turtle necropsy. During the necropsy, students learned how plastic bags, straws, and balloons impact sea turtles. This opportunity provided a catalyst within our learning community. We noticed many of our students who began making personal choices to bring reusable water bottles and lunch containers to school. Our students want to impact the world in which they live positively, and they have the power to make a difference through their school, home, and community.

How will your project address this environmental issue?

Our strategy to address the environmental issues associated with marine debris includes education, stewardship, outreach, and civic action. Education is perhaps the essential element of our project and the most crucial step on marine debris mitigation (NAMEPA 2014). Our approach to educating our young learners about marine debris is to weave environmental concepts connected to marine debris into existing Next Generation Sunshine State Science Standards (NGSSS). The NGSSS aligns with young learners' development and abilities and progresses at each grade level systematically to build a foundation and understanding of science (FLDOE 2021). While closely following the NGSSS developmental progression in science learning, educating students about marine debris while following NGSSS is the educational plan supporting this project. We believe the educational component is a critical part of this project's long-term and lasting success. Stewardship activities connected with the NGSSS standards include beach clean-ups, creating trash art, and civic action where students petition our county commissioners to improve trash collection on our beaches. Additional stewardship activities include efforts to decrease the ecological footprint of our school as we explore actions to reduce, reuse, and recycle the waste created on our school campus. Incorporated into every part of the education and stewardship activities are opportunities to connect with our parents, community, and local scientists through outreach.

This project is incorporated into existing NGSSS standards allowing for seamless integration of environmental education with our science standards. We have also enlisted the support of fellow teachers, parents, and community members excited about this opportunity. The planning process has created many lasting relationships and opportunities that will allow for this project to persist beyond the 2021-2022 school year.

What are the desired outcomes of your project?

The desired outcomes of this project include mobilizing 600 elementary school students and volunteers to pick up trash in our schoolyard and on our beaches. Together we expect to remove 1,500 pounds of trash from our community beaches and schoolyard. Students will design and construct masks using trash collected from stewardship activities. Masks will be shared in art shows throughout our school and community. Students will communicate their data with school and community leaders through a letter writing campaign. Collectively, 300 letters will be sent to our county commissioners to petition them for improvements to our trash cans and trash collection on our beaches. Suggestions for using student artwork on marine debris and funding options will be discussed and shared in the student petitions.

Who will be involved in this project and how?

School leaders, fellow educators, parents, and students are critical to the implementation of this project. Our school leaders support every mission within our school community by supporting educators and students in providing permission, transportation, and planning for field-based activities, such as beach clean-ups and visits from scientists. Our educators are essential to supporting "Clean Up Crew: Empowering Our Future Changemakers" as students learn about marine science. They will help with organizing and preparing students for stewardship activities, field-based explorations, and outreach. Educators will follow through with learning activities before and after the activities listed in this proposal. Our educators are also critical in communicating with the families of our students, which will be necessary for accomplishing the goals of this project. Our educators include the STEAM Lab instructor, (name redacted), the media specialist, (name redacted), the art teacher, (name redacted), and our grade-level team leaders, (four names redacted). Volunteers are essential in every phase of this project. We have an active Parent Teacher Organization with volunteers eager to support our school and educators. Parent volunteers will assist with beach clean-ups, field-based explorations, and outreach. The long-term success of this project and its impact on our students will come from

access to local scientists and the knowledge they bring to our students as they learn about marine science. Our local scientists include (name redacted) (Naval Support Activity-Panama City) and (name redacted) (NOAA), (name redacted) (NMFS). They will support the stewardship activities, field-based explorations and introduce our students to STEM careers, including ocean engineering, mechanical engineering, biologist, and veterinarian.

Whose permission do you need to complete your project?

The success and implementation of "Clean Up Crew: Empowering Our Future Changemakers" depends on permission from the principal of Our elementary school, (name redacted). Support from our elementary school's classroom educators, our media center, and our schools' art program are also necessary for this project's success. In addition to the support of our school community, this project needs to have the support of local scientists from Naval Support Activity-Panama City (NSA-PC), National Marine Fisheries Service (NMFS), and NOAA Fisheries-Panama City Laboratory. We have communicated with NSA-PC STEM Outreach Coordinator (name redacted), (name redacted) (NMFS)-Fisheries Biologist, and (name redacted) (NOAA) to confirm their support of the opportunities listed in this grant proposal.

What activities will the project involve?

(Planet Stewards Note - This section will serve as your proposed implementation plan. While this section is well organized and written in this proposal, for both yours and the benefit of the review team we recommend breaking this section out by month and activity type. If an activity repeats itself in subsequent months it should be listed within the appropriate months, ,but need only be described the first time.)

With the support of NOAA Planet Stewards, our elementary school will embark on a year-long project to educate 600 elementary students about the impact of marine debris through stewardship, art, outreach, and civic action. We will target our upper elementary students in grades 3, 4 and 5 for specific implementation of the following plans and provide school-wide activities that engage our lower grades (K-2). "The Marine Debris Monitoring Toolkit for Educators", created by the NOAA Marine Debris Program and the NOAA Office of National Marine Sanctuaries will guide stewardship activities involving beach clean-ups and data collection. Lessons in the project come from "The Educators Guide for Marine Debris," created by NAMEPA and NOAA for marine debris education for K-5 learners (NAMEPA 2014).

Our school year has four quarters, and each quarter will build on learning from previous quarters to grow students into environmental stewards.

First Quarter: "Looking Out: Trash and Debris on Our Beaches"

The project's first phase will include stewardship, data collection, outreach activities, and STEM career learning opportunities for students in grades 3, 4, and 5. With teachers and volunteers present, students will visit area beaches, conduct a beach clean up and learn from (name redacted) (fisheries biologist for the National Marine Fisheries Service) about sea turtles, nesting, and the impact of marine debris on this species. While collecting trash, students will carefully examine the beach trash cans to evaluate the benefits and drawbacks of open cans on the beach. Waste collected during the beach cleanup will be taken to our elementary school for students to clean, sort, weigh and measure. Each grade level will conduct a beach cleanup at a different location within the same week. The data collected from the beach cleanups will be recorded and shared as students look for significant patterns in the type of marine debris collected along our beaches. Pictures and data will be shared in our media center and through the schools' social media site.

Second Quarter: “Looking in: Reduce, Reuse, and Recycle at School and Home”

The second phase of the project will continue stewardship, data collection, outreach, and STEM activities, focusing on evaluating individual and schoolwide patterns with single-use plastic usage. In science, students will focus on grade-level Next Generation Sunshine State Standards (NGSSS) to learn about Florida's resources, conservation, energy, climate, and weather. The NGSSS standards provide an opportunity to incorporate actions to reduce, reuse, and recycle. Students will collect data from classrooms and the cafeteria on single-use plastic thrown away over the period of a week. The plastic will be collected, cleaned, sorted, and weighed. Data from the collection will be displayed in the media center and shared with the entire school through morning announcements. Students will explore actions they can take to reduce the amount of plastic waste created on our school campus throughout the week. This phase of the project involves collaboration with the art teacher, (name redacted). She will work with students using the integrated marine debris art curriculum created by Washed Ashore in conjunction with NOAA to create masks using trash collected from stewardship activities in this project (NOAA 2021). The trash art created by our students will ultimately be displayed in a school-wide art show and with local community organizations, such as the Panama City Beach Visitor Information Center. In addition to creating the trash art, students will continue learning about sea turtles through a virtual tour of the Gulf World Marine Institute (GWMI) in Panama City Beach. Part of the GWMI mission is to lead in the recovery and rehabilitation of stranded, sick or injured marine mammals and sea turtles. Students will have the opportunity to learn more about STEM careers and the impact of marine debris on species and habitats in our region.

Third Quarter: Taking Action

This phase aims to take action individually, collectively as a school, and seek to influence community decisions on waste disposal on our beaches. To guide students toward taking meaningful action, students will review the data collected in phases 1 and 2 and use the citizen science Marine Debris Data Tracker App to explore the impact of marine debris on a large scale. They will participate in two field trips to Naval Support Activity-Panama City to learn how engineers use robotics in marine environments. They will explore our local landfill to learn how trash in our county is processed. They will formulate a plan to communicate their action plan with school leaders and county officials. In addition to taking civic action, students will be educated through participation in a marine debris art contest. The winning artwork will be displayed in our media center, shared on social media, and communicated as a potential art wrap for beach trash cans. This artwork will educate beachgoers and encourage people to reduce, reuse, and recycle when visiting our beaches.

Fourth Quarter: A Sense of Place

The fourth phase coincides with the NGSSS standards for Life Science. This phase will continue with previous phases in encouraging students to develop a sense of place. Jacques Cousteau is quoted as saying, "People will protect the things they love." The goal of this phase is to continue teaching students about the biodiversity in our marine ecosystems. Students will engage in experiential learning through hands-on activities in our local state park. NOAA biologist, (name redacted), will work closely with our teachers and volunteers to share invertebrates and local species in our bays. Students will have the opportunity to touch, explore, and ask questions. They will learn about sensitive habitats, such as salt marshes and adaptations plants and animals have to survive in these ecosystems. Our year of learning will be shared with local media and through submissions to the National Science Teachers Association journal "Science and Children." Our hope is to inspire our students to develop a sense of place and protect the place they live through personal action and community action.

Data & Collection Activities:

For this project, 600 students will embark on a year-long educational opportunity to remove marine debris from our beaches through education, stewardship, and outreach. Our students and volunteers will remove trash from area beaches near our school's campus. Students will remove trash from three area beaches, sort the debris by type, and record the total dry weight of trash collected. Students will share the data on the citizen science application "Marine Debris Data Tracker." In addition to contributing to the marine debris database, students will share the data with school leaders and present the findings visually in our school's media center. In the second phase of this project, students will investigate single-use plastics in our school cafeteria. Students will dispose of plastic items used in the cafeteria and in their classrooms into labeled bins for one week. At the end of the week, the plastic will be sorted, counted, and weighed. Students will share the data in our media center and with our school leaders. The overall goal of this project is to educate, raise awareness, and take action based on the data collected from both our school and the beach clean-ups.

Which STEM careers will students learn about during the project?

(Planet Stewards Note - A common error made by applicants completing this section is to focus their discussion of the STEM skills engaged in by professionals who may be involved in projects of this type rather than the careers themselves. Planet Stewards wants career paths and skills students will have to acquire to realize a specific career to be presented and discussed, in addition to the skills STEM professionals are imparting to them during the project)

Exposing elementary students to STEM careers is a critical part of the long-term success of this project. Students will have the opportunity to meet and work alongside scientists as they conduct field-based explorations, stewardship, and outreach activities outlined in the proposal for "Clean Up Crew: Empowering Our Future Changemakers." Students will meet with (name redacted), a fisheries biologist and sea turtle educator for the National Marine Fisheries Service, in the first phase. She will share her work with sea turtle conservation and describe the impact of marine debris on sea turtles. In the second phase, students will learn about Gulf World Marine Institute (GWMI) and meet veterinarians and biologists who work to rescue and rehabilitate marine mammals and sea turtles. In the third phase of this project, students will meet ocean engineers who use Remotely Operated Vehicles (ROV's) to survey and monitor marine ecosystems. They will also meet mechanical and electrical engineers to design and build the ROVs. In the final phase of this project, our students will engage in a field-based exploration with (name redacted) at St. Andrews State Park. They will learn about her work as a fishery biologist and the mission of the National Oceanic and Atmospheric Administration. Exposing all students to STEM careers and STEM principles provides a foundation for students to fully fully engage in and contribute to their communities, and for succeeding in STEM-related careers, if they choose (NSTC 2018).

How will you conduct outreach within your community? Describe your specific communication and outreach plans.

(Planet Stewards Note - Following review of the proposal, the Planet Stewards Review Team recommended the applicant include the following reporting activities in an application amendment prior to funding being awarded. The applicant has done so and these can be seen in the section below:

- 1. Increasing and directing outreach activities to people outside your school within your community, your county or your state.*
- 2. Consider asking reporters to cover the project.*
- 3. Consider publicizing your project online through the school's website other groups' websites,*

and engaging in use of social media

4. Consider outreach events or an exhibit in the local Chamber of Commerce)

Vital to the success and long term impact of “Clean Up Crew: Empowering Our Future Changemakers” is that our students, educators, and staff conduct outreach as they share experiences, learning, and ideas with our community. In phase one, data from the beach clean up will be shared in our media center, on the school television (ITV), and through our social media sites. The media center is the site on our campus used daily by every student in our school. In phase two, debris collected from the beach clean ups will be used to create masks using trash collected from stewardship activities. The trash art will visually communicate the type and amount of marine debris collected on our area beaches. This student trash art will be shared in a prominent location on campus, in our school art show, and with our Panama City Beach Visitor Information Center. In phase three, students will formulate an action plan to reduce waste within their school and community. The action plan will involve writing letters to county commissioners to recommend improvements to the trash collection on our beaches. To continue the outreach portion in phase three, students will participate in a marine debris art contest. The winning artwork will be displayed in our media center, shared on social media, and communicated as a potential art wrap for beach trash cans. This artwork will educate beachgoers and encourage people to reduce, reuse, and recycle when visiting our beaches. In phase four, we will reach out to local media outlets to share student stewardship activities conducted throughout the year. Finally, after implementing a year-long effort to educate students through stewardship and outreach, we will submit a proposal to the journal for the National Science Teachers Association “Science and Children.”

Budget

Materials Required for Classrooms, Stewardship, and Outreach Activities				
Activity	Potential Materials	Quantity	Cost Estimate Per Item	Total Cost Estimate
Beach Trip	Transportation - Via School Bus	6	\$400	\$2,400
Trash Pick Up	Reusable work gloves	120	\$1	\$120
	Heavy duty trash bags	5	\$12	\$60
	Tarps	2	\$25	\$50
	Grabber/reacher tool	25	\$12	\$300
	Storage containers	10	\$12	\$120
Trash Art	Trauma Scissors	2	\$30	\$60
	Art Paper	1	\$25	\$25
	Classroom pack of markers	1	\$50	\$50
	Acrylic Latex Caulk	40	\$4	\$160
Activities	Ocean current model	4	\$30	\$120

	Classroom composter	2	\$50	\$100
	Plankton nets	2	\$32	\$64
	Hand nets	13	\$5	\$65
	Kiddie Pool	4	\$10	\$40
	Sea turtle life cycle model	6	\$14	\$84
	Curriculum support	1	\$100	\$100
	Watershed Model	1	\$900	\$900
Substitute Teacher	District Fees	2	\$90	\$180
Total Costs				\$4,998