



# Clean Up Crew: Empowering Future Changemakers

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## Abstract

“Clean Up Crew: Empowering Future Changemakers” is a NOAA Planet Stewards project designed to educate, inspire, and motivate students about marine debris mitigation in the K-5 public school setting. This was a year-long project integrating marine debris education, stewardship, and outreach with Next Generation Science Standards (NGSS, 2013). Students embarked on a journey to understand and learn how marine debris impacts our coastal community, school, and homes. Together, we removed 327 pounds of trash from area beaches, completed more than 800 acts of environmental stewardship, and shared our learning with our community through outreach and art. Students applied STEM principles throughout the project to address marine debris through personal and civic action to improve our world.

The walls of the Patronis Elementary School media center were transformed to showcase the importance of our waterways, marine animals, and marine ecosystems.

Photo Credit: Kelley Hodges

## Introduction

“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. Our backyard and 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 and develop a lifelong love and understanding of the surrounding environment. 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.

Clean Up Crew: Empowering Future Changemakers is a NOAA Planet Stewards project designed to educate young learners about marine debris and its impact on beaches and marine life. As coastal community residents, we witness the impact of derelict fishing gear, single-use plastics, and abandoned recreational equipment on our beaches and waterways. It is common 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). The pressure placed on our sensitive marine ecosystems is immense,

**Table 1. Possible connections to the Next Generation Science Standards (NGSS Lead States, 2013)****Performance Expectations**

2-PS1-1 Matter and Its Interactions: Plan and conduct an investigation to describe and classify kinds of materials by their observable properties.

K-ESS3-3. Earth and Human Activity: Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.

5-ESS3-1 Earth and Human Activity: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

**Science and Engineering Practice**

- Planning and Carrying Out Investigations
- Analyzing and Interpreting Data
- Constructing Explanations and Designing Solutions

**Disciplinary Core Idea**

- ESS3.C: Human Impacts on Earth Systems: Things that people do to live comfortably can affect the world around them.
- ETS1.A: Defining and Delimiting an Engineering Problem: Asking questions, making observations, and gathering information are helpful in thinking about problems.
- ETS1.B: Developing Possible Solutions: Designs can be conveyed through sketches, drawings, or physical models.
- ESS3.C: Human Impacts on Earth Systems: Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space.

**Cross-Cutting Concept**

- Patterns: Patterns in the natural and human designed world can be observed.
- Cause and Effect: Events have causes that generate observable patterns.
- Energy and Matter: Objects may break into smaller pieces and be put together into larger pieces, or change shapes.

Overview of Grade Level Plans for Each Nine Week Period			
First Quarter (August 10- October 8)			
	3rd Grade	4th Grade	5th Grade
Major Themes	Nature of Science	Nature of Science	Nature of Science
Stewardship	Beach Clean Up & Sea Turtle	Beach Clean Up & Sea Turtle	Beach Clean Up & Sea Turtle
Data Collection	Count/Sort Marine Debris	Count/Sort Marine Debris	Count/Sort Marine Debris
Outreach Activities	Share with school & social media	Share with school & social media	Share with school & social media
STEM Career Activities	Nancy Evou-NOAA	Nancy Evou-NOAA	Nancy Evou-NOAA
Second Quarter (October 11 - December 22)			
	3rd Grade	4th Grade	5th Grade
Major Themes	Energy & Transformations	Earth's Features/FL Resources	Climate & Weather
Stewardship	Reduce, Reuse & Recycle	Reduce, Reuse & Recycle	Reduce, Reuse & Recycle
Data Collection	Cafeteria Plastic	Cafeteria Plastic	Cafeteria Plastic
Outreach Activities	Marine Debris Masks	Marine Debris Masks	Marine Debris Masks
STEM Career Activities	GWMI-Virtual	GWMI-Virtual	GWMI-Virtual
Third Quarter (January 7 - March 11)			
	3rd Grade	4th Grade	5th Grade
Major Themes	Plants	Life Cycles	Comparative Anatomy
Stewardship	Civic Action	Civic Action	Civic Action
Data Collection	Marine Debris Data Tracker	Marine Debris Data Tracker	Marine Debris Data Tracker
Outreach Activities	Art Contest	Art Contest	Art Contest
STEM Career Activities	NSA-PC Field Trip	NSA-PC Field Trip	NSA-PC Field Trip
Fourth Quarter (March 14- May 25)			
	3rd Grade	4th Grade	5th Grade
Major Themes	Adaptations	Adaptations & Food Chains	Adaptations
Stewardship	Earth Week Challenge (Choice Bo	Earth Week Challenge	Earth Week Challenge
Data Collection	Choice Boards & Trash Removal	Choice Boards & Trash Removal	Choice Boards & Trash Removal
Outreach Activities	Marine Debris Art on Trash Cans	Marine Debris Art on Trash Cans	Marine Debris Art on Trash Cans
STEM Career Activities	Michelle Duncan @ NOAA	Michelle Duncan @ NOAA	Michelle Duncan @ NOAA

**Figure 1. Project Timeline and Stewardship Activities**

and it is time to create meaningful educational and stewardship opportunities for our young learners and future changemakers.

## The Process

This project integrated marine debris education, stewardship, and outreach with Next Generation Science Standards (NGSS, 2013).

Education is the most crucial step in marine debris mitigation and a critical part of the project's long-term and lasting success. (Zeh, 2021). Broad goals in designing the project included guiding learners to become aware of marine debris in their community, within their schools and homes, and engaging learners in meaningful stewardship to reduce marine debris through personal action and community outreach.

We started by outlining a year-long educational plan and identifying the project's stakeholders. They included our school administration, classroom educators, community partners, and local organizations. A quarterly plan was established and shared with the stakeholders (see [Figure 1](#)), and tentative dates were set prior to the school year.

## Project Outcomes

- Mobilize elementary students to engage in environmental stewardship activities connected to removing and eliminating marine debris in our school and community.
- Remove 300 pounds of trash from area beaches and our school campus
- Inventory plastic generated in the school cafeteria over a week and use it to create trash art.
- Implement NGSS-aligned science lessons to educate students about marine debris.
- Engage our students in outreach activities that allow them to share their learning and stewardship with our local community.

## Implementation

### Looking Out: Trash and Debris on Our Beaches

Our school is just miles from the Gulf of Mexico, and interconnected waterways surround our community. Sea turtles and shorebirds nest on our beaches, and marine life include dolphins, manatees, sharks, and fish. Our community has local organizations dedicated to conservation and education. We partnered with a local non-profit, "Keep PCB Beautiful," to offer beach cleanups on three Saturday mornings between August and October.

Our school families removed 327 pounds of trash from area beaches. We collected the trash and displayed it at school for all students to see. They marveled at the things people leave behind (hats, sunglasses, and shoes) and wrinkled their noses at other trash items (cigarette butts, straws, and food wrappers). The trash was cleaned, sorted, measured, and weighed in the STEAM Lab and integrated with NGSS-aligned science lessons.

In addition to the beach cleanups, we adopted sea turtle nests through a local NOAA affiliate, Panama City Beach Turtle Watch (PCB Turtle Watch). Volunteers from PCB Turtle Watch allowed students and families to attend nest excavations. At the excavations, we counted the eggs, observed hatchlings, and learned from biologists about the nesting habits of sea turtles.



**Image 1.** Marine debris from beach clean-ups is placed on a tarp outside of the STEAM Lab. The marine debris in this photo was used in the STEAM Lab for students to sort, measure, and weigh. Photo Credit: Kelley Hodges



**Image 2.** Students are using marine debris to learn about the properties of matter.

Photo Credit: Kelley Hodges



**Image 3.** Students are participating in a mock turtle stranding. In this photo, they are working alongside a scientist to measure, weigh, and observe a stranded turtle. Together they moved the turtle to a safe location for medical help.

Photo Credit: Kelley Hodges

Continuing our learning about sea turtles, we invited Gulf World Marine Institute to our school to share with students their work to rescue and rehabilitate stranded marine animals. Students participated in a mock turtle stranding and viewed artifacts like the jawbone of a sperm whale. All of our community partners helped students make connections between marine species and the impact of marine debris on animals and ecosystems.

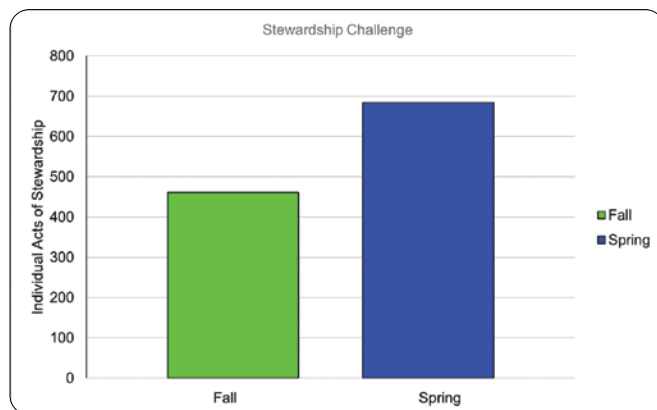
### Looking In: Reduce, Reuse, and Recycle at School and at Home

Opportunities for students to investigate and observe marine debris at school and at home started with collecting single-use plastic used in our school cafeteria. 100% of our students receive free and reduced lunch. We focused our collection and observations on plastic generated from the cafeteria and remained mindful that many students have little control over how their food is prepared or served. Student teams outfitted with gloves and a bucket collected plastic at the end of lunch. They collected sandwich bags, straws, lids, trays, utensils, and bowls. The plastic was cleaned and sorted, and displayed in the STEAM (Science, Technology, Engineering, Arts and Mathematics) Lab. With each grade level, we discussed the types of plastic and the amount of plastic waste generated in a week and over a year. We created a list of actions students can take to reduce plastic waste, and we created

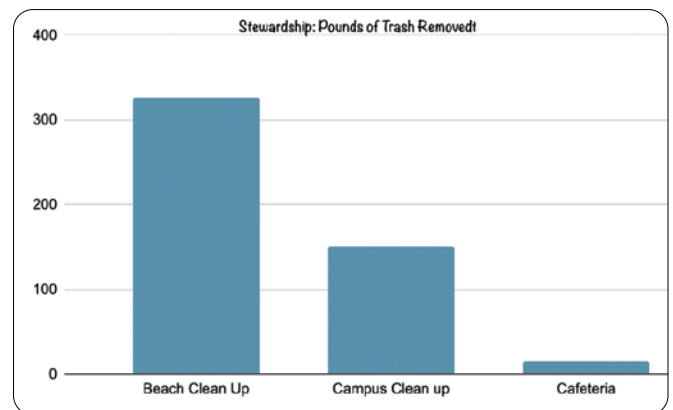
recommendations to reduce plastic in our cafeteria. Student observations included plastic utensils and Styrofoam trays used only once. Students created a list of recommendations for our cafeteria provider and wrote more than one hundred letters with specific examples to reduce single-use plastic in our cafeteria. We invited a representative from the food service company to visit with our students and listen to their concerns about single-use plastic in our cafeteria. The visit taught us that the Styrofoam trays and plastic-wrapped utensils were due to COVID guidelines. Many reusable items, like lunch trays and utensils, were stored away for the time being. While we were not successful in reducing plastic in our cafeteria, our students learned they could question our cafeteria providers and seek change through positive communication.

### Taking Action: What Can We Do?

Stewardship is the careful and responsible management of something entrusted to one's care. Our goal included guiding students to learn that they can make a difference in the world in which they live. An essential element is encouraging them to make personal choices at school and home to reduce single-use plastic and marine debris. Two stewardship challenges were offered to the entire school, one in the fall and one in the spring. A choice board with nine stewardship activities was sent home with students. The choice board included a parent letter explaining the goals for the challenge. Challenges included bringing a litterless lunch, a reusable water bottle, and picking up trash at school or in their



**Figure 2.** We collected data on the number of stewardship activities completed through the stewardship challenges.



**Figure 3.** Pounds of debris removed during clean-up activities.

neighborhood. Altogether, the choice board had nine challenges. We collected data on the number of challenges completed in the fall and compared the data with those completed in the spring.

Students' excitement and desire to engage in environmental stewardship throughout the school year blossomed. By November, students formed clubs and used recess time to pick up trash in our schoolyard. Data collected from student-driven stewardship included participation in campus cleanups and weighing and sorting the amount of marine debris collected from beach and campus cleanups.

### Outreach

Art is a powerful way to communicate, educate, and inform. In this project, we used art to communicate and share the stewardship activities completed by our students. Students



**Image 4, 5, 6.** A local fishing rodeo showcased our 3rd-grade trash art. 100 students' art pieces were displayed at the art show, along with posters communicating the purpose of the art and the stewardship activity of removing marine debris from area beaches. Photo Credit: Kelley Hodges

created trash art and participated in a school-wide marine debris art contest. Our art teacher, Jessica Hughson, found inspiration in the Washed Ashore curriculum and guided students to create art from marine debris collected during beach cleanups.

Artwork included a sea turtle made from buckets and shovels, a crab made from spoons, birds made from cups and straws. The artwork caused people to stop and think and wonder. It also provided an educational opportunity for our community to learn about the impact of marine debris. The art contest allowed students to share their learning about marine debris in a creative format.



**Image 7.** 87 students submitted artwork for the marine debris art contest. The artwork was displayed in the STEAM Lab before the winning artwork was chosen. This image shows the artwork displayed in the classroom. Photo Credit: Kelley Hodges

The art contest was a school-wide event; we received more than 55 submissions. Students drew pictures of sea turtles surrounded by fishing nets, plastic bottles, and spoons floating in an ocean filled with wildlife. They chose messages like "Save Our Beaches" and "Be a Part of the Solution...Not



**Image 8.** The trash cans created from the marine debris art contest are stacked in front of our school. Photo Credit: Kelley Hodges

the Pollution” to accompany their artwork. We sent the images from the winning artwork to a local company that transferred the images to vinyl and wrapped trash cans with them. The trash cans now line our school and continue to inform and educate visitors, students, and staff about the impact of marine debris on our ecosystems.

## Results

Stewardship:

- 120 members from our school (parents and children) removed 327 pounds of marine debris from area beaches.
- 90 students completed 357 acts of stewardship in the fall and 105 students completed more than 490 acts of environmental stewardship in the spring.
- Outreach: 300 pieces of trash art were created by our third, fourth, and fifth-grade students.

## Conclusion

We experienced a few challenges with the implementation of this project. Each challenge required communication, flexibility, and creativity to accomplish the vision of the project. Ongoing COVID restrictions limited off-campus field trips. This required us to coordinate with community organizations and offer events in alternative formats. We invited the experts to our school and embedded learning within the normal school day. We experienced additional unintended positive results as students felt empowered and energized to engage in stewardship. We had groups of students form environmental clubs and they used recess to pick up trash around the school campus. We also had a wonderful response from parents and our community supporting our efforts to encourage environmental stewardship.

## References

- NGSS Lead States. 2013. *Next Generation Science Standards: For States, By States*. <https://www.nextgenscience.org/search-standards>
- NOAA. 2021. *National Oceanic and Atmospheric Administration*, 26 May 2021, <https://www.noaa.gov/education/resource-collections/marine-life>.
- Zeh, J. 2021. *Marine debris: What is it and how can you help?* NAMEPA. Retrieved January 2, 2023, from <https://namepa.net/2017/01/04/2017-1-3-marine-debris-what-is-it-and-how-can-you-help/>

## About the Author

**Kelley Hodges** is a Science Intervention Teacher at Patronis Elementary School and an Adjunct Professor of Science Education at Florida State University-Panama City. She lives in Panama City Beach, Florida, and is in her 20th year of teaching. Her career in education includes teaching college, high school, middle school, and elementary school science and mathematics. Her current role at Patronis Elementary School includes hands-on inquiry-based science instruction for students in grades 3, 4, and 5 and science instructional support and guidance for all classroom teachers. Since joining Patronis Elementary School, she has secured funding to support science instruction and environmental education and developed a schoolwide environmental stewardship program focused on marine debris and its impact on marine ecosystems. She established a multi-age First LEGO League robotics program at Patronis supporting efforts to bring coding, robotics, fun, and core values to young learners. Her work in the community includes curriculum development and teacher training for STEM in a Box, a joint effort between Florida State University and the Navy Lab-Panama City. Kelley earned a Bachelor's degree in Animal Physiology and Neuroscience from the University of California, San Diego and a Master's Degree in Science Education from Florida State University. Kelley can be reached at [hodgekc@bay.k12.fl.us](mailto:hodgekc@bay.k12.fl.us) or [khodges1993@comcast.net](mailto:khodges1993@comcast.net).