

- **Program Name:** 4<sup>th</sup> Grade NOW Science, Systems for Survival: The Impacts of Marine Debris
- **Program Goal(s):** Build awareness of the impacts of marine debris in the food web.
- **Learner Outcomes:** as a result of participating in this program, what should learners be able to think, feel, or do in a new way?
  - Drawing how marine debris impacts the food web
  - Accurately identifying what constitutes marine debris
  - Analyzing bolus contents from albatross specimens collected in a national marine sanctuary
  - Integrating and evaluating multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem
  - Showing interest in participating in a beach clean-up
  - Valuing how national marine sanctuaries protect the ocean
- **Program Elements**
  - # of facilitators: 3
  - Length of learning experience: 4 hours
  - Target audience: 4<sup>th</sup> grade
  - Program Capacity: Up to 30 students per program session; total of 20 sessions
  - Budgeted expense/revenue amounts: grant revenue
  - Grant related considerations: Current grant funding from NOAA Marine Debris requires pre and post-test student evaluation, and the overall project goal is to increase local community participation in coastal clean-ups.
  - Marketing Needs (i.e. recruitment strategies): Reaching out to all 4<sup>th</sup> grade teachers teaching in Sequim, Port Angeles, and Crescent school districts.
    - Marketing Blurb: NOW Science – Elementary: Learn about the ocean food chain –from plankton to seabirds- and the feeding mechanisms of the plants and animals in that food chain. Study the origins and effects of marine debris and what happens when marine debris interferes with these ocean inhabitants. Where is that marine debris coming from and what can we do to prevent it from getting into the ocean? What is micro-debris and how is it especially harmful to the ocean living creatures? Find out this, and more, in Systems for Survival: The Impacts of Marine Debris.
  - PR Strategies: Having a teacher guest authoring a Feiro blog or posting in their school districts bulletin.
  - Web site & Printables: Program description and Common Core aligned resources list on Web site. Update booklets with CoastSavers cleanup dates and any edits. Print 1 per student.



- **Logistics Plan:** description of resources used to facilitate program, DO NOT include efforts to acquire resources
  - Location (with contact info): Feiro Marine Life Center, NOAA Olympic Coast National Marine Sanctuary classroom, and Port Angeles waterfront
  - Partners (with contact info): NOAA Olympic Coast National Marine Sanctuary, Nicole Harris, 360-457-6622 x19
  - Safety needs: No special safety requirements. Practice rope safety on pier during the plankton tows and identify where the rescue rings are located.
  - Registration needs (applications, waivers, forms): Book registrations on “NOW Science” Google calendar and complete classroom visit and field investigation forms in calendar binder.
  - Parking/transportation needs: Each teacher arranges their own bus transportation and sends an invoice to Feiro.
  - Food provided: none
  - Volunteer needs: No volunteers needed for classroom visit and 3 volunteers needed for the field investigation (2 in Feiro’s classroom and 1 in the exhibits).
  - Facility needs: Feiro exhibits, Feiro classroom, Sanctuary classroom
  - Evaluation plan: Student pre and post-test, teacher satisfaction evaluation

#### **Program Agenda:**

- Classroom visit- 1hr (within one week prior to class’ field investigation)
- Field investigation- 3hr (preferably to be completed before noon)
  - 10min introduction
  - 50min per station (Feiro classroom, Feiro exhibits, and Sanctuary classroom)
  - 10min transition time between stations

#### **Detailed Outline of Program:**

- **Assessing prior knowledge:** strategies and/or specific activities to determine learner’s prior experiences/knowledge relevant to learner outcomes. Include examples and specific questions when possible. A pretest will be given to each student to complete upon arrival to the classroom during the pre-trip visit. The same questions will be asked at the end of the field investigation to measure the students’ growth during the program. Note: AmeriCorps requirements apply for knowledge gain. See Nicole at OCNMS for latest requirements.

##### Questions:

- 1) How many oceans are there?
- 2) What is one major benefit (good thing) we receive from the ocean?
- 3) How are National Marine Sanctuaries protecting the ocean?
- 4) What type of marine debris material is most commonly found (circle answer)
- 5) How does marine debris affect wildlife?
- 6) Complete this marine food web by adding plankton (with image)
- 7) How can you help reduce the impact of marine debris?

**Classroom Visit:** Two of the three program facilitators visit each classroom prior to the class' field investigation. During the classroom visit the facilitators will assess the prior knowledge of the students as well as introduce key concepts of the program. The classroom visit covers topics including, what is considered marine debris, what is a food chain, and how different animals feed.

Students will receive their field investigation booklets to use in pre-activities for reading comprehension.

Prior to the classroom visit, facilitators will forward the Common Core aligned resources to each classroom teacher.

Common Core Aligned Resources:

Articles

<http://www.scholastic.com/browse/article.jsp?id=3758051>

<http://www.katu.com/news/local/Barge-brings-tons-of-tsunami-debris-marine-trash-to-Seattle-321189571.html>

<https://student.societyforscience.org/article/tiny-plastic-big-problem>

Websites

<http://www.seaweb.org/resources/briefings/MarineDebris.php>

<http://oceanservice.noaa.gov/facts/marinedebris.html>

<http://water.epa.gov/type/oceb/marinedebris/index.cfm>

[http://water.epa.gov/type/oceb/marinedebris/factsheet\\_marinedebris\\_debris.cfm](http://water.epa.gov/type/oceb/marinedebris/factsheet_marinedebris_debris.cfm)

<http://thankyouocean.org/threats/marine-debris/>

<http://marine-litter.gpa.unep.org/kids/kids.htm>

<http://education.nationalgeographic.com/activity/marine-debris-a-legacy-of-litter/>- for students who need more of a challenge

<http://marinedebris.noaa.gov/info/plastic.html>

[http://olympiccoast.noaa.gov/living/marinelife/birds/specieslist/spp\\_albatross.html](http://olympiccoast.noaa.gov/living/marinelife/birds/specieslist/spp_albatross.html)

## Posters

Marine Debris Starts on Land.pdf

## Videos

The Nurdles Quest for Ocean Domination <https://www.youtube.com/watch?v=KpVpJsDjWj8>

## Blogs

<https://marinedebrisblog.wordpress.com/>

### **Field Investigation- Three Station Rotation**

Prior to arrival have the teacher split the students up into three groups. Each group will start at a different 50 minute station and rotate through all three stations. A post-test will be given to all students at the end of each groups' last station. One facilitator will also point out the free pass to Feiro and the CoastSavers clean up dates found on the student field investigation booklets.

**Station 1-Plankton Investigation:** Students are walked through what criteria must be met to categorize an animal or plant as plankton. The students will learn the significance of plankton to the marine and terrestrial ecosystems. Out on the pier, all students will have the opportunity to participate in a plankton tow and identify their catch under microscopes back in the classroom. After the students spend some time reviewing their samples a premade plankton sample that contains microplastics will be projected for the students to identify the problem and understand how animals can unknowingly ingest plastics.

**Station 2- Guided Exhibit Exploration:** Students will work in teams to remove marine debris from their container of sand, this includes sifting for nurdles. The students will examine the different sizes and material that make up marine debris items. As a group they will brainstorm actions that they can take in their own lives to reduce the impacts of marine debris. Working in pairs the students will complete a scavenger hunt using magnified images of animals in the exhibits. The students will use good observation skills, looking for colors, patterns, and textures, as well as teamwork to locate the animal shown on their card. For three or four teams of students have nine animal cards. Once a team locates their animal, they will work together to identify how and what their animal likes to eat and how that animal could possibly be affected by marine debris. After the team has answered all the questions they will receive a new card. The goal is for each team to complete three cards.

**Station 3- Bolus Dissection:** Students will learn how watersheds, and our actions as residents of a watershed, can extend beyond the local scale and connect on a global scale, in this case via the Strait of Juan de Fuca and the ocean currents of the Pacific. Following a brief overview

of the Olympic Coast National Marine Sanctuary and the importance of marine protected areas, students will learn the life history of the Blackfooted and Laysan albatross, their feeding habits in the Pacific basin, and their breeding grounds on the Northwestern Hawaiian Islands. Students will then watch a four-minute movie by Jean-Michel Cousteau on ocean currents and marine debris, focusing on the remote islands of Northwestern Hawaii in the middle of the Pacific. The video is followed with students conducting an albatross bolus dissection. The students will use the bolus to identify the natural prey items and the un-natural (man made) prey items the albatross is finding in the ocean and feeding to their chicks. The lesson concludes with students graphing the contents of the bolus by categories of natural prey items, and marine debris items, comparing the amounts of each, and discussing actions we can take to reduce the amount of marine debris entering our oceans.

- **Extension Activities:**

- Read relevant news articles on topics that could include but not limited to, entanglement, marine debris ingestion, albatross boluses, derelict fishing gear, and have student visit marine debris related questions.
- See Common Core aligned resources
- Students write letters to companies or city advocating for policy changes using evidence from their field investigation
- Design a school yard field investigation
- Students can participate with friends and/or family in International Coastal or Washington Coastal Clean-up events.