The Plastic Challenge: Finding the Cure to Students' Lack of Knowledge Towards Marine Debris

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Introduction

When it comes to environmental issues, students seem to be indifferent about the decisions they make locally, which can cause a major global impact. For example, at our high school there is trash frequently found within the detention basins surrounding our campus, on the campus walkways, in planters and right next to the trashcans. Pajaro Valley High School is located on a wetland right next to the West Struve Slough ESHA (Environmentally Sensitive Habitat Area). Our school is categorized as an environmentally friendly school per an agreement with the California Coastal Commission in order to build this school in proximity to the wetlands. Due to the fact that our nearby sloughs flow to the oceans, we were concerned about trash, specifically plastics around our campus. Marine debris is defined as any human made object discarded or disposed that enters coastal or marine environment. Therefore we wanted to focus on educating our peers on how plastics/ marine debris not only affects animals, but our beaches and us as well.

Methods and Materials

Beach Clean-Up

METHODS:

1. With our mentor George Matsumoto we picked three beaches from our Monterey Bay area (Santa Cruz, Zmudowski, and Monterey State Beach) to collect data from throughout 3 different days (Fig 1.1)
2. Before making the trip to our first beach, we looked at a tide chart to find what time frame low tide occurred. (Fig 1.2) .

Fig 1.1

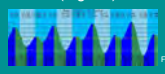


Fig 1.2

3. At the first beach, we labeled that site as SITE A; we then found the high tide mark.
4. 100 ft were measured out with measuring tape along the high tide mark.
5. We labeled a Zip lock bag with the beach name, tide area, site number and date.
6. With gloves on we went along the measuring tape picking up any plastics within 2 feet of the tape. We confirmed objects that were in the range using the ruler, plastics found were put in the Zip lock back.
7. Once the high tide sampling area was done we picked up our tape and walked ten paces down the beach to what would become our low tide sampling area. Steps 5-6 were repeated.
8. Once the low tide area was done we picked up our tape and walked 20 paces back up to what would become our dry area mark. Again repeat steps 5-6.
9. After SITE A sampling was done we walked two minutes to the next site, while keeping time with our cell phones.
10. At the end of the two minutes the location we arrived at became our SITE B. we then repeated steps 4-8
11. Once done with the low, high, and dry tides at SITE B, we picked up all materials and then walked in the opposite direction from before for 4 minutes.
12. At the end of the four minutes the area where we were at became our SITE C. Repeat steps 4-8.
13. Once done at SITE C, all our materials were picked up and we were done for the day.
14. The next 2 days we arrived at the other two beaches before low tide and repeated this whole protocol

MATERIALS:

All of the materials listed were graciously provided by the WATCH Staff

- Zip lock bag
- Sharpie
- Rulers
- Measuring tape
- Gloves
- Camera
- Notebook
- Tide chart

Surveys and Presentation

With data collected from the beach, we decided to make a presentation and teach our classmates, but first we needed to know what background information our peers knew. To assess this, we created a pre-survey

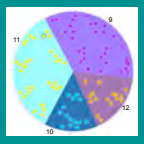
METHODS:

1. With the technology the Macs provided to us from WATCH we used a program called Inspire Data to make our pre survey. It included questions like, "What is marine debris?"
2. Five teachers signed up to take their students (96 all together) to the computer lab to take our survey
3. The day of the survey we gave the teachers a script so every student would hear the same information.
4. After the pre-surveys were taken we then made our power point presentation
5. We then presented the same 5 classes that took the pre-survey.
6. After the presentation we edited our pre-survey for our post survey.
7. The same students took our post survey.

MATERIALS:

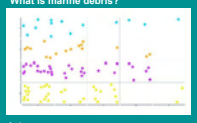
- Inspire Data software
- Mac computers
- Computer Lab
- Students

What grade are you in?

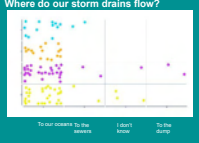


BEFORE PRESENTATION

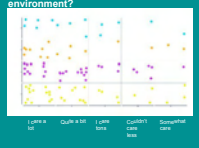
What is marine debris?



Where do our storm drains flow?

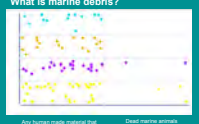


Do you have an interest in the environment?



AFTER PRESENTATION

What is marine debris?



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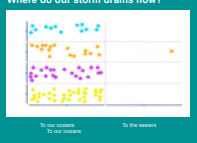

Do you have an interest in the environment?

Results

Looking at the data charts from the beach collections, it was found that the most plastics were in the high tide area for all three beaches that were surveyed. However some plastic and other trash were found in the dry area. No plastic or any other kind of trash was found on the low tide area. A possible reason no trash or plastics were found in the low tide area is because whatever plastics may actually end up there will be washed away by the waves as it is exposed more often to the currents of the oceans. Also, whatever plastics are in the low tide area will be pushed up by the waves onto the dry or high tide areas.

As for the surveys and presentations, when comparing the pre-survey to the post survey, an improvement was seen among the knowledge of the students. After the results of the post survey were analyzed, we saw an outstanding percentage (89%) of the students' behavior change.

Conclusion

Not many know about the troubles of marine debris, that is why we took this challenge to educate those who lack this knowledge. Our survey results show that we were able to help them understand the importance of the marine debris situation. Students gained more knowledge, as well as a change in perspective, which lead to more students caring about the environment. The goal of educating the students was therefore reached because the results showed that the students learned more after our presentation. We take pride in knowing that because of our hard work and strong dedication to this project we produced further awareness between the students of PVHS.

Resources

- Silverman, Jacob. How Stuff Works. 2008. Discovery Company. 18 November 2008. http://science.howstuffworks.com/great-pacific-garbage-patch.htm/printable
- What Is Marine Debris. 8 August 2007. National Oceanic and Atmospheric Administration. 20 Sept. 2007. http://marinedebris.noaa.gov/whatis/welcome.html

Acknowledgements

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