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Developing an educational portfolio and survey for the new Monterey Bay National Marine Sanctuary Visitor Center : a capstone project ...

Tera Farnsworth
California State University, Monterey Bay

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Developing an Educational Portfolio and Survey for the New Monterey Bay National
Marine Sanctuary Visitor Center

A Capstone Project

Presented to the Faculty of Earth Systems Science and Policy

in the

College of Science, Media Arts, and Technology

at

California State University, Monterey Bay

in Partial Fulfillment of the Requirements for the Degree of

Bachelor of Science

by

Tera Farnsworth

August 10, 2005

To the ESSP Faculty:

Environmental interpretation aids in the understanding of a person's surroundings, enables them to know why they are important and to give them greater appreciation for the environment as a whole. It is a way to help people enjoy the nature that surrounds them. The current problem though is the barrier that is formed between what they hear and what they understand.

Most environmental programs are not designed to fit a diverse audience which is why the barrier begins to form. By creating a visitors center in Santa Cruz, the Monterey Bay National Marine Sanctuary, would like to create educational programs for the public and students with the goal of being able to reach out to a diverse audience.

For my project, I worked under the guidance of Stacia Fletcher from the Monterey Bay National Marine Sanctuary. I worked to create a database of informal education centers in the Monterey and Santa Cruz areas. From these centers, I also created a portfolio containing the different organizations print pieces (i.e. activities, curriculum, etc.) to pass along to the Marine Sanctuary exhibit designers and educational programmers as examples of different types of existing programs. I distributed a survey to all science teachers in Santa Cruz County schools to get feedback on what types of programming they would like to see for their students.

The reason I chose to do this project was because of my interest in environmental interpretation and education. A few semesters ago I took ESSP 349: Interpreting Monterey Bay Natural History for the Community. I took a great liking to this class because I enjoyed being able to educate people about science without having to be in a classroom setting. After taking the class I decided that I wanted to pursue a career in environmental interpretation. I felt that this capstone project would be a good step in that direction because not only would I be helping form the groundwork for a really great project and organization but I would also get an idea of what type of education programs already exist in the area and be able to analyze them and see how good some of them really are.

This project is important in getting a foundation for the programs that the visitors center will have. Without the research that I am doing the Sanctuary Center will not have as good of perception of other educational programs in the area and the potential for having beneficial teacher/student programs will be less. By researching other informal education science centers in the area, it will be easier to determine what types of programs work best and also allow for the MBNMS to not duplicate what already exists. Also, by creating a survey, the Sanctuary will be able to find out directly what is desired by teachers for their students and be able to incorporate those needs with the hopes that they will bring their students to the visitor center and have a good learning experience.

The reason I find this work to be important is because the more advanced this world becomes, technologically, the more we are devastating the environment. Environmental education is extremely important in aiding in the conservation of the world and its natural

beauty. Today people are always in such a rush that they don't stop to appreciate their surroundings. By aiding in the program development of the visitor center, one more step is being taken to protect not only the sanctuary but the entire world. What one person experiences and learns at the visitor center they can apply to any environmental situation.

The two areas of depth that I have focused on are MLO # 8 (Scientific Inquiry) and Science Education. In order to satisfy MLO #8 I have distributed surveys to K-12 teachers to get feedback on what they would like to see as part of the visitor center program and curriculum. To satisfy the Science Education area of depth I have collected educational information from other informal science education centers to use as a guide for the creation of the Monterey Bay Marine Sanctuary visitor's center.

Thank you for taking the time to read this letter and I hope that you enjoy reading my paper as well.

Sincerely,

Tera Farnsworth

Abstract

Environmental interpretation allows people to gain an understanding of their surroundings, know why the environment is important and to have a greater appreciation for the environment as a whole. By creating a visitors center in Santa Cruz the Monterey Bay National Marine Sanctuary would like to create educational programs for the public and students to make people more environmentally aware. The overall goal for my project was to compile a database of informal science education centers in the Monterey and Santa Cruz areas, compile a database of schools in Santa Cruz County and use this information to aid in the development of educational programs for the Sanctuary visitor center. This was done by using the database of informal education centers to collect information from each of them, such as curriculum, activities, etc., about their current school programs they have in place. The database of teachers Santa Cruz County was used for survey distribution in order to get feedback on what types programs for their students they would like to see at the visitor center.

Introduction

Environmental interpretation is an important part of everyone's life. It enables people without a background in science to gain an understanding of their surroundings, know why the environment is important, and ultimately foster a greater appreciation for the environment. Interpretation "involves translating the technical language of a natural science or related field into terms and ideas that people who aren't scientists can readily understand" (Ham, 1992). It allows a person to gain a sense of place and to better appreciate the importance and delicacy of their environment as "conservation of natural resources is inextricably bound to public attitudes and opinions" (Newton, 2001). One major point that Firth (1998) stresses is that "scientific information is the basis of wise decision making and this information must be available to everyone in our society," therefore it is vital that society understand how to use the information they are presented with and how it will benefit society.

The issue at hand, though, is that "environmental illiteracy is still a major impediment to protecting our life support base" (Bjorkland, 2001) because the future

quality of life is dependent on how we educate people, specifically children, in the present. Hudson (2001) states that “There is a large gap between what members of the general public hear and what they understand about environmental problems...” What I believe Hudson is trying to say is that many times an environmental issue is not explained in its simplest terms, meaning that the general public cannot grasp the meaning of what is going on or the intensity of it because the issue has not been broken down and laid out in a way that most people who are not scientists can understand. Simcox (1992) believes that by taking the focus from enforcement and shifting towards interpretation and interpersonal contact, we are laying a foundation for sharing values and understanding between the interpreters and the cultural visitors.

Culture, ethnicity, and language are key issues within environmental education. One of the challenges interpreters face in creating ‘bridges to understanding’ is posed by the increasing cultural and ethnic diversity of people using environmental resources, such as parks (Simcox, 1992). As Gramann, Floyd, and Ewert (1992) state, the United States’ ethnic diversity is increasing and by 2005 the ratio of non-Anglo minorities to Anglos will be one to three. With the increase in ethnic diversity, it is important to know who the potential audiences could be because “failure to know our audience is as great an error as a factual mistake or using the wrong medium. It means our message is not being received and any interpretation that does not somehow relate what is being displayed or described to something within the personality or experience of the visitor will be sterile” (Dillon, 1995).

Part of this problem is that programs are not designed to fit a diverse audience. Most programs are designed to fit your English speaking, middle class family. Therefore,

they must be designed to fit a diverse audience and also be “sustainable within the communities they seek to involve” (Hudson, 2001). According to Dillon (1995) studies have shown that interpretive centers (i.e. parks, museums, etc.) are not reflective of the entire American society because they don’t encompass the many cultures or languages of the people that are visiting the interpretive centers. This can be potentially offensive to certain visitors, causing people to not want to visit at all because they feel as there is no reason for them to visit, and cause them to be frustrated by not understanding their surroundings. White (1991) gives us some things to keep in mind when addressing an audience: “When RELATING to the group, REALIZE that they are about to embark upon a mission that will open their mind to a diversity of mini-alien worlds. REGARD [them] as an intelligent species hungry for knowledge and challenges. RESPECT [them] and RECEIVE them without judgment.”

Another important purpose in environmental interpretation is to change the attitude of the public relating to natural resources, to gain respect and concern for the natural environment, and to increase public knowledge and understanding for the role of an agency in their interpretive efforts (Rennie, 1980). The agency, in this case, is the Monterey Bay National Marine Sanctuary (MBNMS). The MBNMS is a federally protected marine area located off the California coast extending from Cambria to Marin. Their main goal is to aid in resource protection, research, education and public use of this diverse area (MBNMS website). Specifically, their educational goals are “To promote awareness, understanding, appreciation and stewardship of the Monterey Bay National Marine Sanctuary through public education and conservation programs” (MBNMS website).

For a long time the MBNMS has been somewhat under represented in the community because they lack a place where the public can go and learn about the sanctuary directly. Currently, the only place where one would be able to learn what a Marine Sanctuary is, is the Monterey Bay Aquarium. They have offices in the Monterey and Santa Cruz areas but upon entering you will find they are more for administrative purposes than educational. The MBNMS is now in the process of developing an education visitor center so the public has somewhere they can learn about the Monterey Bay National Marine Sanctuary.

The creation of the visitor center is vital because it will be a centralized place where visitors can be educated about the sanctuary. "The MBNMS envisions an interactive interpretive center highlighting the sanctuary's extraordinary natural and cultural resources, the National Marine Sanctuary System and other NOAA programs, and the vital role citizens play as ocean stewards" (MBNMS website). In order to get the most out of the educational impact on these potential ocean stewards, the design of the visitor center will have to be informed by programs already in place and available to the public such as those at the Monterey Bay Aquarium, Elkhorn Slough National Estuarine Research Reserve, Santa Cruz Natural History Museum, and the Seymour Discovery Center. Input from local teachers whose students will also be key users, will be critical to a successful visitor center. The desired outcome of this visitor center will hopefully lead to the public appreciating their surroundings, being more environmentally conscious, and making conservation a part of their lifestyle.

The overall purpose of my project was to get an idea of the existing programs from informal education centers around the Monterey Bay area and use them to guide the

development of new environmental educational/interpretational programs for the new Monterey Bay National Marine Sanctuary visitor center. This will be an opportunity to develop programs that will awaken the public to environmental issues that surround the Monterey Bay area. The other purpose of this project was to survey science teachers in Monterey and Santa Cruz County schools to get an idea of what kind of educational programs would be good for this center and also what they would like to see personally.

Methods

Portfolio/Database

Purpose: The purpose of creating a portfolio was to identify and study the different approaches that organizations in the Monterey and Santa Cruz areas have taken to science/environmental education.

In order to determine what types of organizations had these types of programs in place I used an existing database created by Stacia Fletcher and also found some via the internet. I contacted places such as the Seymour Center, Elkhorn Slough Natural Estuarine Reserve, and the Monterey Bay Aquarium. I also identified state parks that were located in Monterey and Santa Cruz Counties with the exception of Año Nuevo, which is located in San Mateo County. After I identified the various organizations, I created a database with the organization name, contact info, a web address, and any program details if applicable (Appendix A & B).

Next, I contacted the organizations by phone and email to obtain information about any types of school programs they might offer. If programs were offered I requested supplemental materials to be sent to me.

With this information, I developed a portfolio (Appendix C) containing each organization's materials and any other affiliated materials (i.e. a web links).

In characterizing each organizations approach to environmental science education, I asked the following questions:

1. Does the organization offer environmental programs?
2. Does the organization offer school programs?
3. If so, what types of programs do they offer?
4. Does the organization have any supplemental materials to go along with their programs (i.e. curricula, activities, etc.)?

Survey

Purpose: The purpose of creating a survey (Appendix D) was to get feedback from K-12 teachers at schools in Santa Cruz County (Appendix E) to see what they would like as part of the school programs for the visitor's center. I worked with Stacia Fletcher of the Monterey Bay National Marine Sanctuary (MBNMS) to determine what types of questions should be on the survey and how it should go about being distributed. Some things we kept in mind while developing the questions were: potential programs to be offered, convenience of field trips, and cultural issues. After getting the approval of the head of each school district and the Committee for the Protection of Human Subjects of Research, some of the surveys were mailed out to the schools and others were hand delivered. A total of 188 surveys were distributed.

Survey Analysis

In order to analyze my survey results, I selected applicable questions and entered them into an excel spreadsheet. For questions 1, 2, 6, 10 and 14 I calculated the average

of the total responses. Also, for questions 1, 2, 6, and 10 after I calculated the average from each response I inverted the answers ($1/\text{average}$) so that the graphs would emphasize the more popular answers instead of the least popular ones. For questions 3, 5, 7, and 13, I calculated the percentage of “Yes” and “No” responses. For the remaining questions I summarized the responses into short paragraphs (Appendix F). In order to simplify some of the summarized responses I grouped the similar answers into categories, i.e. habitats, diversity, history, etc.

Results

For the database I was able to compile a list of 20 organizations in Monterey County and Santa Cruz County ranging from the Monterey Bay Aquarium, Sanctuary Whale Watching Cruises, O’Niell Sea Odyssey, and Elkhorn Slough Safari. For the complete list please see Appendix A. I compiled information such as address, phone number, operating hours, descriptions of what types of programs the organization offers, and how many children they can accommodate.

I was able to collect information from 14 of the organizations to put in my portfolio. I collected things such as teacher curriculum, student activities, and information about the various student programs offered through the organization. For samples of what I collected see Appendix B.

Out of a total of 188 surveys that were distributed, 22 were returned. My return rate was about 11%. Ninety percent of the surveys returned were from K-5 teachers which is the main target audience as they are more likely to take their students on field trips compared to teachers in grades 6-12.

Question #1

Question 1 asked for teachers to rank different types of programs on a scale of 1 to 3, with 1 = highly desired or needed, 0.66 = would be nice to have, and 0.33 = not needed or desired. There were 9 different types of programs for them to rank with this scale. All options had an average ranking of 0.5-0.9 (Figure 1).

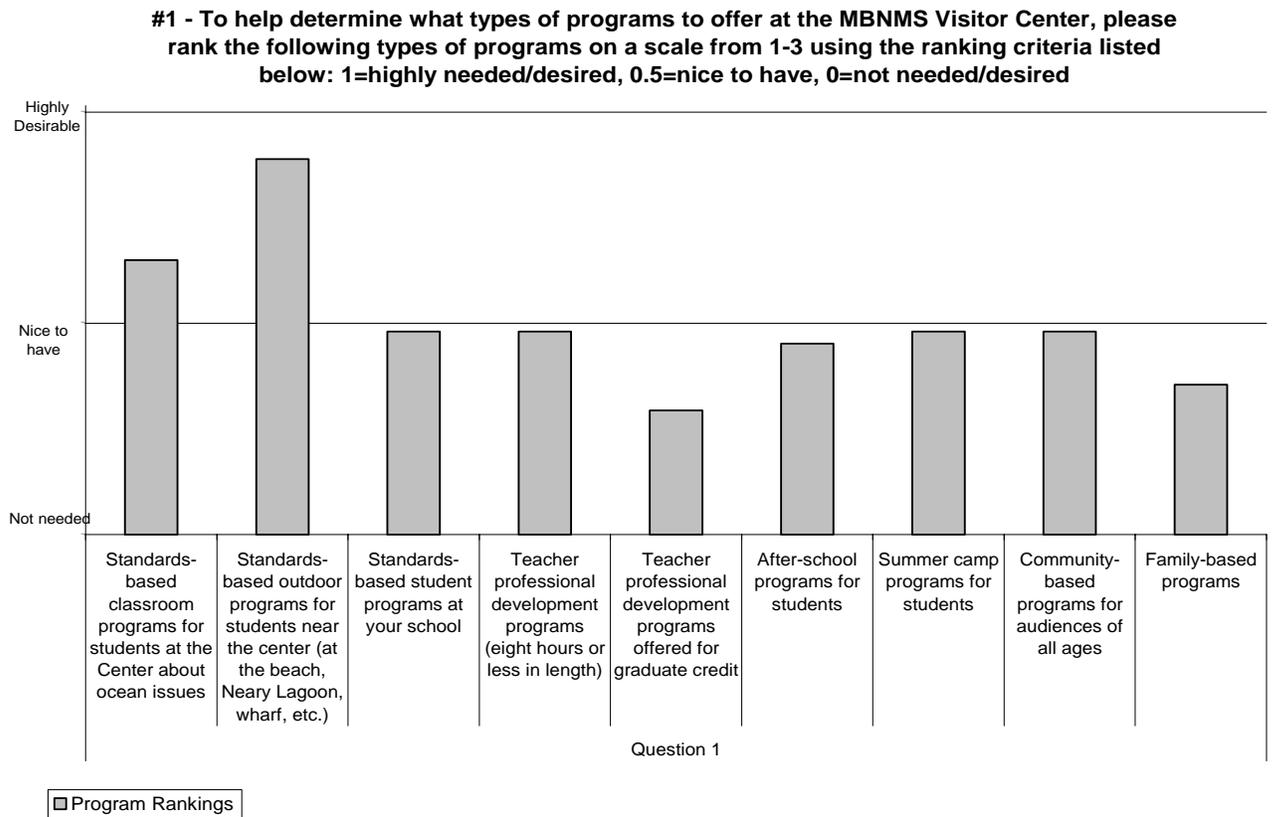


Figure 1. Average Program Rankings for Question #1

Question #2

This question asked for teachers to rank different types of materials/educational resources that could be provided through the MBNMS Visitor Center on a scale of 1 to 3, with 1 = highly needed, 0.66 = would be nice to have, and 0.33 = not needed or desired.

There were a total of 8 different materials/educational resources to rank with this scale.

The average rankings ranged anywhere from 0.4 to over 1 (Figure 2).

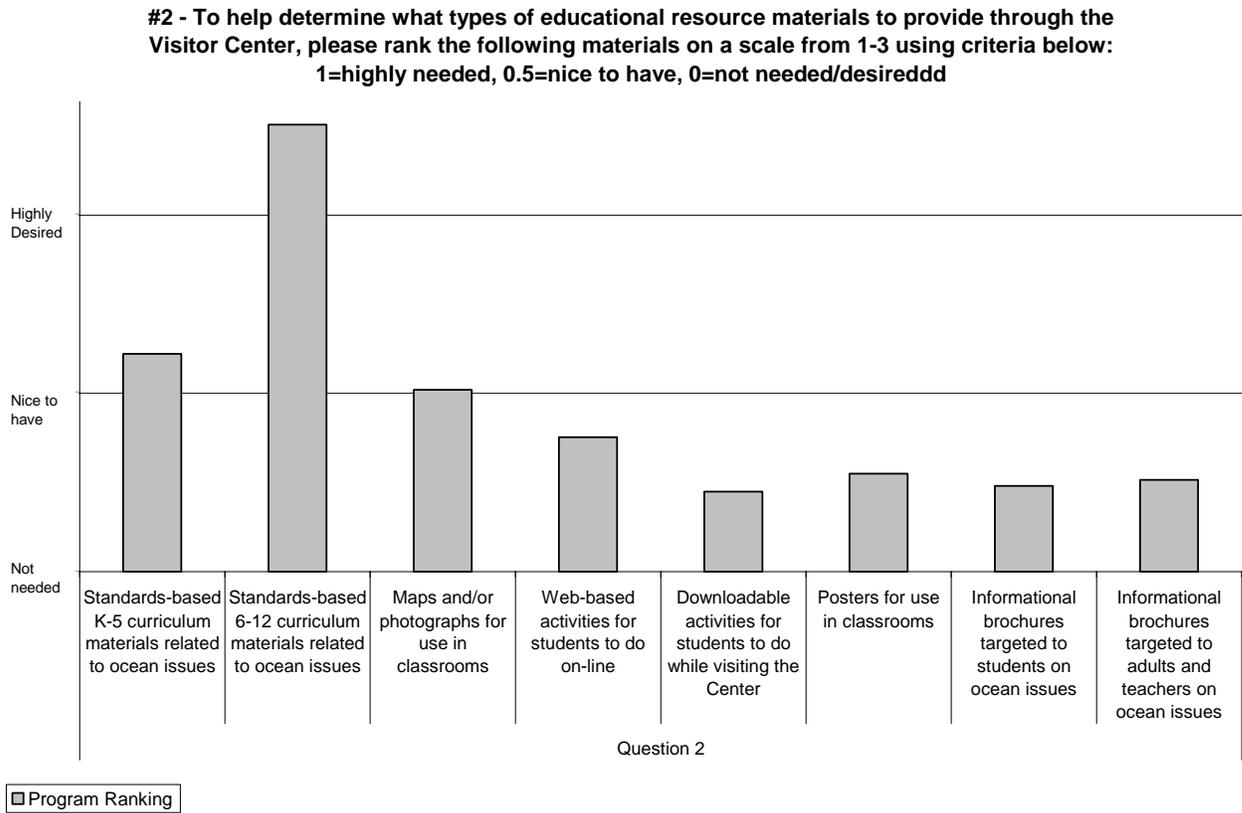


Figure 2. Average Educational Resource Materials Rankings

Question #3

This question asked teachers if they taught topics related to marine science or the MBNMS and if they did to give a brief description. 100% of teachers said they taught topics related to marine science or the MBNMS. 81% of teachers gave a brief description of the topics that they taught related to marine science or the MBNMS (Appendix F).

The most common topics were habitats, such as the kelp forest or watersheds, (6 people), diversity, which includes diversity of animal life, (7), conservation and pollution (7), and ecology, such as food webs, (6).

Question #4

Question 4 asked what topics or concepts teachers would like to see covered in programs for students in grades K-2, 3-5, 6-8, and 9-12. There was a variety of answers ranging from ocean conservation to the geography and geology of the Monterey Bay region (Appendix F). The most common topics were conservation and pollution (10), diversity (8), and habitats (6).

Question #5

This question asked teachers if the MBNMS were to offer a summer graduate level course that involved curriculum and program planning for the MBNMS Visitor Center if they would be interested in attending. 60% answered “yes they would be interested in attending.”

Question #6

Teachers were asked, using a scale of 1 to 7, 1 = most likely to attend and 7 = least likely to attend, to rate when they would be most likely to attend a teacher program of 3 hours or less offered during the academic school year. They were given the options of Monday evening, Tuesday evening, Wednesday evening, Thursday evening, Friday evening, Saturday morning, and Saturday afternoon. The most favored time was Wednesday evening and Friday evening was the least.

#6 - Using a scale of 1-7 when would you be most likely to attend a teacher program of three hours or less offered during the academic school year? 1=most likely to attend and 0=least likely to attend

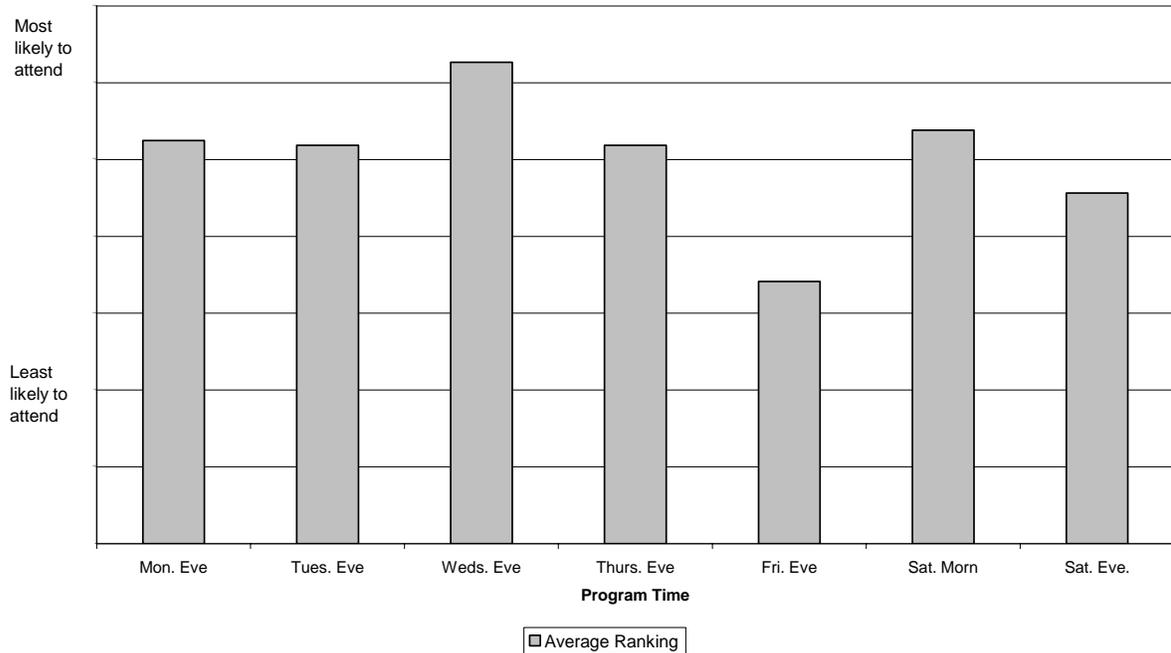


Figure 3. Average ranking of time teachers would be willing to attend a teacher workshop

Question #7

Question #7 asked if teachers typically took their students on field trips and if not, then why and if so, where they took them. 95% of teachers answered “yes” they took their students on field trips. The most popular locations for teachers to take their students were: Long Marine Lab/Seymour Center, Monterey Bay Aquarium, Wilder Ranch, and various beaches and museums in the area. For a complete list of locations please refer to Appendix F.

Question #8

This question asked what the earliest time classes could arrive at the Visitor Center. The most favored time was 9:00am.

Question #9

This question asked what the latest time classes could depart from the Visitor Center to arrive back at school on time. The average time was between 1:00pm-2:00pm.

Question #10

Teachers were given a list of eight times between 9am and 12 pm and asked what would be optimum start times for programs to be offered at the Visitor Center if they were 45 minutes to one hour in length. They were asked to choose all that applied and the most favored time frame was between 9:30 am and 10:30 am, with 10 am being the most preferred.

#10 - If we offer programs 45 minutes to one-hour in length (grade level dependent), what would be the optimum start times for programs to be offered at the MBNMS Visitor Center?

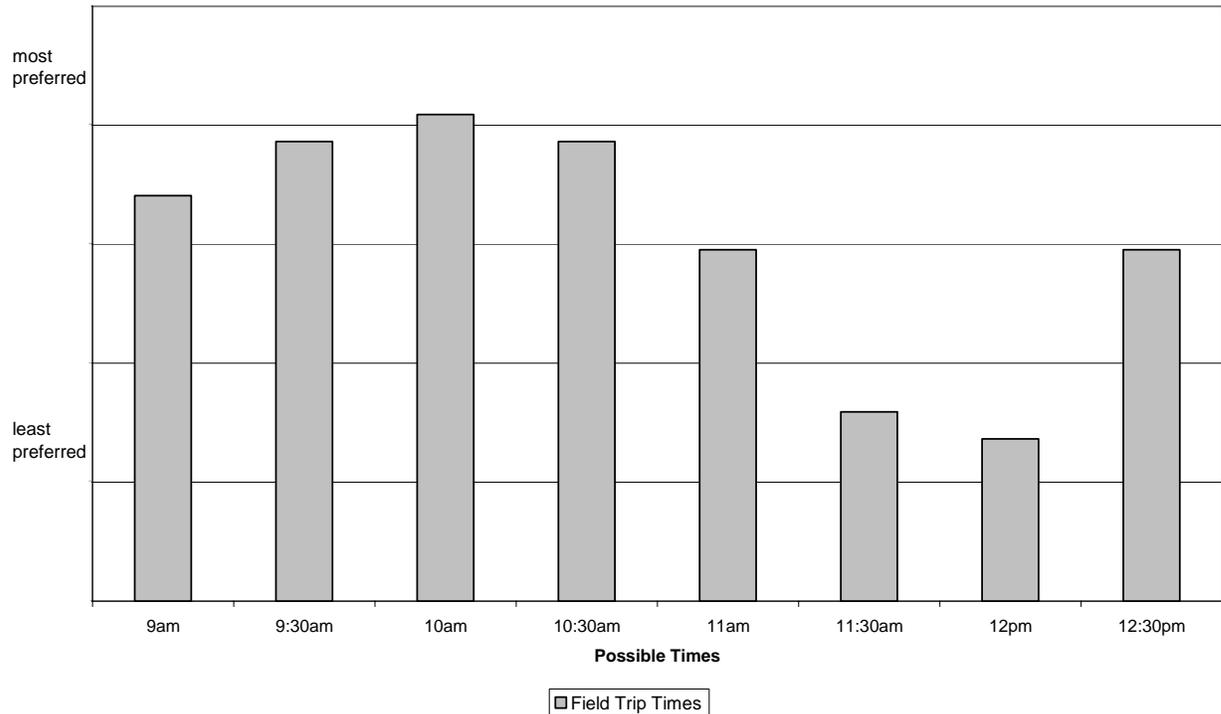


Figure 4. Average optimum start times for programs offered at the MBNMS Visitors Center

Question #11

This question asked teachers to complete the following sentence. “A really great exhibit in the MBNMS Education Center would be one that...” Twelve teachers used the words “interactive” or “hands-on” in their answer to this question, which was the most popular response. Some others were that it “incorporates grade level standards,” “meaningful for students,” and one that was very creative “showed a big 3-d map of the land under the bay and discussed the formation of the bay and habitats created by the various depths and currents.” There were a variety of answers received for this question (Appendix F).

Question #12

This question asked what percent of students in the class were English as Second Language learners. Ten teachers said that 0-20% of their class were English Language Learners and twelve teachers said that 21-100% of their class were English Language Learners.

Question #13

Teachers were asked if they felt as though programs/exhibits at field trips sites were geared for a multi-cultural audience and if yes, then why and to give a possible example and if not, then why and to give examples here if possible as well. Sixty percent of teachers felt that places that they took their students were geared for multi-cultural audiences. The most common reason was that the hands-on exhibits are able to reach multiple audiences (Appendix F).

Forty percent felt that programs/exhibits were not geared towards a multicultural audience because many of the docents/exhibits/program materials are only geared for

English speakers making it very difficult for English as Second Language Learners to understand (Appendix F).

Question #14

Finally, teachers were asked to choose which of the following options would best meet the needs of their students: Programs and materials offered in English, programs and materials offered in English with programs using sheltered¹ teaching techniques, programs and materials offered in Spanish, or programs and materials offered in English and Spanish. The most common answer was programs and materials offered in English using sheltered teaching techniques with programs and materials being offered in English and Spanish the next most common answer. These questions are exclusive.

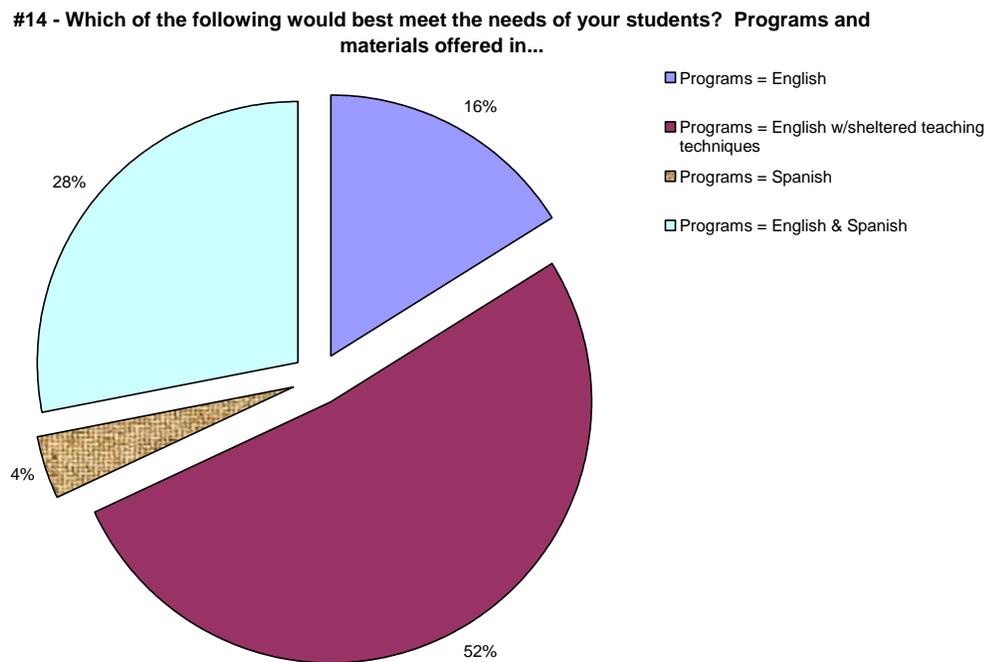


Figure 10. Average % of programming that would best meet the needs of students.

¹Sheltered teaching techniques incorporate explanations using very simple vocabulary and very visual gestures which include miming.

Discussion

A conclusion that could be based on the general response in the return rate of the survey is that teachers are too busy to fill out surveys and if they do take the time to fill them out they do not want to take the time to answer questions that require them to fill in the blanks. I did however receive a fairly reasonable amount of surveys and was still able to make some recommendations about programming, field trips, and cultural issues related to the creation of the MBNMS Visitor Center.

In order to get better responses, some advice I would have for someone attempting to survey teachers in the future would be to do it in the middle of the school year when they are not as busy as during the beginning or end of the year. Also, I would suggest meeting face to face with as many teachers as possible so that they will be more connected with the survey they are filling out and not just view it as a piece of paper, but they will also see the person behind it as well which would probably help get a higher return rate. Another important thing would be to make good connections with the people working in the front office of the school (i.e. the secretaries or principal) because they do have some influence over the teachers and can be very helpful in distributing surveys and collecting them for you.

I was, however, able to conclude that teachers feel that there is a great need for various types of programs to be offered at the Visitor Center. They particularly would like to see programs that are standards-based². Also, they would like programs that will fit into classroom activities at the visitor center as well as outdoor activities.

² Standards-based means that California has a set of education standards that teachers must follow for teaching various subjects.

The reason these two choices were almost certainly the most popular is because they will have the most benefit in the long run by being able to fit into what teachers already are teaching in the classroom and allowing them to take that learning to other parts of the community and have the students relate to it.

Teachers also see the importance for different types of educational materials/resources to be provided through the Visitor Center. The most desired materials/resources were, again, standards-based curriculum for k-12 materials related to ocean issues. This once again emphasizes that teachers are looking for things that they can take outside of the classroom to teach their students. The next most desired materials/resources were maps and/or photographs for use in the classrooms, which can aid in pre/post visit activities to the visitor center materials.

Ninety-five percent (question 7) of teachers take their students on field trips. They listed 44 different locations that they take their students to (Appendix F) and this is mainly because of the close proximity of most of the schools in Santa Cruz County to the many different types of attractions, such as museums, beaches, and aquariums (Appendix F). Seeing that teachers are able to take their students to a variety of places it would be almost certain that they would be able to take their students to the MBNMS Visitor Center.

Culture, meaning linguistic and ethnic background, should play a big part in influencing the design of the visitor center because there are students who are immigrants or not native English speakers. For this reason, I chose to also ask if teachers felt that programs or exhibits were geared for multi-cultural audiences. I asked this in the hopes of determining if this were a common or uncommon practice at local educational centers

where the teachers visited with their students. According to the responses I received, 40% of teachers felt most educational centers are not designing their programs with the non-English speaking population in mind (Question 13). They said they felt this way because docents, signs, exhibits, etc. are only geared for the English speaking audience (Appendix F). However, 60% of teachers felt that programs were geared for a multicultural audience (Question 13) because even though programs were only in English they were “hands-on” and “interactive” (Appendix F).

Recommendations

My overall recommendation for the MBNMS Visitor Center would be to offer a variety of standards-based programs and resources that are geared for a diverse audience that will be accessible by students and teachers visiting on field trips. It would also be beneficial to try and complement what teachers are teaching about the MBNMS and marine science in programs at the Visitor Center.

Teachers would be able to incorporate classroom teaching with field trip activities. According to the teachers responses for grades:

- K-2 - they would like to see topics like conservation, animal diversity, habit diversity, and life cycles included in the visitor center programming
- 3-5 - they would like to see topics such as conservation, geology, ecosystems, and habitat diversity included in the programming
- 6-8 - they would like to see conservation
- 9-12 - they would like to see more specific things such as studies in marine mammals, evolution, and careers in oceanography (Question 4).

Compared to question 3, which asked what teachers were teaching, the answers are very similar, which shows that teachers want to see things that they teach in the classroom outside of the classroom so the students can relate to those topics. I suggest that topics like conservation, animal diversity, habitat diversity, and life cycles be incorporated into all of the grade level activities with a standards-based focus so that teachers can use them in the classroom.

The portfolio that I created is a good way to see what types of programs are already in existence in the area, and try not to duplicate them, but instead to add on to them. This would be done by creating new exhibits or programs with different materials and activities that will further allow students to learn about different elements of the marine sanctuary but also have some kind of interconnectedness to these other programs in the area.

Based on the materials I was able to collect for the portfolio, I was able to conclude that the various organizations are all teaching topics that fall under the category of biological science, such as: natural history, animal diversity, habitat diversity, and adaptations (Appendix C). Therefore I would recommend that the visitor center incorporate more topics in the area of physical science such as: ocean currents, movement of sand, and also the connection between physical and biological sciences (i.e. how one affects the other). In one of the comments received from a teacher on the survey, they suggested the visitor center incorporate a large 3-D map of the Monterey bay and the land beneath it and discuss how this was all formed and also show the habitats created by the various depths and currents (Appendix F). This is a prime example on

how to tie in the biological and physical aspects of science and then relate them to one another.

Currently it seems that the larger organizations such as Elkhorn Slough National Estuarine Research Reserve and the Monterey Bay Aquarium are fit for various audiences by providing materials in English and Spanish. The Ventana Wilderness Society also has programs which are geared for the “at-risk,” or troubled, youth. Some of the other various organizations offer things for the non-English speaking audience, but I don’t feel that any one of these organizations fully encompasses what a good multicultural experience should be. A few ways to improve upon what these organizations already have are to:

1. Make materials/exhibits available in languages such as Spanish
2. Have bi/multilingual docents
3. Make special sheltered programs available to the students AND public.

This would allow for entire families to share an experience they might not otherwise be able to share.

In order to assess the quality of the programs already in existence, I feel the best way to do this would be to:

- survey teachers again about the good and bad aspects of their current field trip destinations
- survey educational coordinators at each site so assess the qualities (good and bad) of their programs
- Observe them on a first hand basis. This would allow the program coordinator for the MBNMS to design programs based on what the other

organizations are teaching and to improve upon them and not duplicate them.

- try to test runs of programs or exhibits created for the visitor center before they are open to the public. Then, survey the participants to find out what areas can be improved upon because someone could design what they feel is the perfect program or exhibit, but it may not seem that way to other people. Also, other people can make suggestions about things that can be added to or removed from these programs or exhibits.

All of these recommendations combined and implemented in the MBNMS Visitor Center would give students and the public the multiple resources they need to be able to educate themselves about the importance of not only the local environment, but the global environment and pass their knowledge of this importance on to friends and family in an attempt to better protect our beautiful environmental resources.

Acknowledgements

I would like to thank Stacia Fletcher of the Monterey Bay National Marine Sanctuary for giving me the opportunity to work on a fun project and for all of her time, help, and support.

I would also like to thank Dawn Hayes of the MBNMS who introduced me to Stacia Fletcher.

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I would like to thank Henrik Kibak, my capstone advisor, for all of his help, great suggestions, and support.

I would especially like to acknowledge all of the organizations that I contacted that took time to send me materials for my portfolio and were friendly and helpful through the whole process.

I would also like to acknowledge all of the teachers and schools of Santa Cruz County who participated in my survey.

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Appendix A

Organization	Address	Phone	website	programs	operating hours	days program offered	# of children accomodated
The Banana Slug String Band	P.O. Box 2262 Santa Cruz 95063	(888) 327- 5847	http://ww w.bananas lugstringb and.com/	learning science through music - some curriculum on the website, teacher workshops, school theater workshops	must call for booking info	n/a	n/a
Elkhorn Slough National Estuarine & Research Reserve	1700 Elkhorn Rd Watsonville 95076	(831) 728- 2822	http://ww w.elkhorn slough.org /esnerr.ht m	k-8 field experience, training for teachers, field activities, plankton tow, water quality monitoring, binoculars, owl pellet dissection, bird identification, videos for classroom use	Weds-Sun: 9am-5pm	Guided Tours: Sat-Sun School Programs: Weds-Fri	120 students per day
Elkhorn Slough Safari	P.O. Box 570 Moss Landing 95039	831- 633- 5555	www.elkh ornslough. com	Floating classroom tours through moss landing	Schedule varies by season & week to week	7 days a week	23-25 students, 2 adults
Friends of the Sea Otter	125 Ocean View Blvd. Pacific Grove	831- 373- 2747	www.seao tters.org	in-class presentations about history, ecology & survival of sea otters (Available for k-8, libraries,			30 max

				camps, & other public groups) Sample materials online			
Mission Springs Outdoor Education	1050 Lockhart Gulch Rd. Scotts Valley 95066	(831) 335-9133	http://www.mission-springs.com/main.php	5-8th grade outdoor education program			
Monterey Bay Aquarium	866 Cannery Row Monterey 93940	831) 648-4800	http://www.mbayaq.org/	field trips for school students, teacher workshops & openhouse,	10am-6pm or 9:30am-6pm May 25-Sept. 5 & Holidays	Facilitated programs: Mon-Fri (During School session) Self Guided: All week or summer	32 at a time max depending on program
Surfrider Foundation - Santa Cruz Chapter	P.O. Box 3968 Santa Cruz 95063	831-476-7667	http://www.surfridersantacruz.org/	presentations for school groups on conservation			
Seymour Center at Long Marine Lab	100 Schaffer Rd. Santa Cruz 95060	(831) 459-5725	http://www.w2.ucsc.edu/seymourcenter/	school programs & teacher workshops	Tues-Sat 10am-5pm Sun. 12-5pm Closed Monday	Discovery Lab Tour: Tues-Fri - Oct '04-Jun '05 Reserved School Tour: Tues-Sun all year Self-Guided: Tues-Sun All Year	32 max 20 max 160 max
Santa Cruz City Museum of Natural History	1035 E. Cliff Drive Santa Cruz 95062	831-420-6115	http://www.santacruz-museums.org/	Docent Led Tours, Touch Pool, Education Kits to loan to schools	Tues-Sun: 10am-5pm	Tues-Fri: 9am-2pm	
Save Our Shores	345 Lake Ave. Suite A Santa Cruz	831-462-5660	http://www.saveourshores.org/	Save Our Shores Sanctuary CD Rom, Educational			

	95062			1 Videos, Beach Clean-up Kits, Enviroscap e watershed model, Sanctuary Boogie Woogie Blues Puppet Show			
Oneil Sea Odyssey	2222 East Cliff Drive, Ste 222 Santa Cruz 95062	(831) 475- 1561	http://ww w.oneillse aodyssey. org/	Marine Biology, Ecology, and Navigation taught on a Catamaran (use teacher login page for teacher packets, username- your name password - seateacher)			
Life Lab Science Program	1156 High St Santa Cruz 95064	831- 459- 5476	www.lifel ab.org	Help schools develop gardens, teacher training, teach about recycling and conservati on,		Seeds of wonder:M ondays 9- 11 Garden Classroom: April-June - Tues-Fri: 10am-1pm Farm-to- fork: Sept- Nov - Tues-Fri: 10am-1:15 Field-to- Market-to- You: Oct- June - Weekly 9am-11am	25 max 30 max 30max
Monterey Bay Salmon and Trout Project (STEP - Salmon & Trout Education			http://ww w.mbstp.o rg/	STEP - Salmon and Trout Education Prog. - salmon			

Program)				lifecycle in schools www.stepo nline.info			
Pacific Grove Museum of Natural History	165 Forest Avenue Pacific Grove 93950	831) 648-5716	http://www.pgmuseum.org/	education outreach program for classroom visits, field trip tours	Tues-Sun: 10am-5pm	same	60 max
Santa Cruz Museum of Art and History	705 Front Street Santa Cruz	(831) 429-1964	http://www.santacruzmah.org/index.html	School Tours, evergreen cemetery tours, artology & history detectives,	Tues-Sun: 11am-5pm	Artology - Thurs Mornings Oct-May History - Tues Mornings Oct-May General & Cemetery - All year	
M.A.T.E	MATE Center MPC 980 Fremont St. Monterey 93940	831-645-1393	www.marinetech.org				
Friends of Moss Landing	8272 Moss Landing Rd Moss Landing 95039	831-771-4100	http://friends.mlml.calstate.edu/	Tours of MLML to introduce people to the conservation efforts of MLML		Mon-Fri	10 or more
Camp Sea Lab	100 Campus Cntr Bldg. 42 Seaside 93955	582-5091	www.campsealab.org	Marine Science Camp Adventure for youth ages 8-13			
Ventana Wilderness Society	19045 Portola Dr. STE F-1 Salinas 93908	831-455-9514	www.ventanaws.org	Natural Science Discovery Camp			
Sanctuary Cruises	25515 Hidden Mesa Road Monterey	(831) 643-0128	www.sanctuarycruises.com	Whale Watching Cruises	Tues-Sun: 7am-8pm	Tues-Sun	

	93940					
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Appendix B

County	Park Name	Phone #	Programs offered	
Monterey	Andrew Molera SP	667-0528	1.2.3.8	
	Asilomar SB	372-4076	7	
	Fremont Peak SP	623-4255	6	
	Limekiln	667-2315		
	Marina SB	384-7695	1.8	
	Monterey SB	384-0618	1.7.8	
	Monterey SHP	649-7118	2.3	
	Moss Landing	384-7695	1.8	
	Pfieffer Big Sur SP	667-2315	1.2.5.6	
	Point Lobos SR	649-2976	1.2	
	Point Sur SHP	625-4419	2	
	Salinas River	384-7695	1.8	
	Zmudowski	384-7695	1.8	
	Santa Cruz	Forest of Nisene Marks SP	763-7063	1.3.6.8
Henry Cowell Redwoods SP		335-4598	1.3.5.6.8	
Manresa SB		761-1795	1.5.6.7	
Natural Bridges SB		423-4609	1.3.8	
New Brighton SB		464-6329	1.3.5.6	
Portola		650-948-9098	1.5	
Santa Cruz Mission SHP		425-5849	2.3	
Seacliff SB		685-6442	1.2.3.7.8	
Sunset SB		763-7062	1.5.6	
Twin Lakes SB		427-4868	7	
Wilder Ranch SP		426-0505	1.2.3.8	
Big Basin Redwoods SP		338-8860	1.3.5.6	
San Mateo		Ano Nuevo SR	650-879-2025	1

Program Codes

- 1** Natural History Field Trips
- 2** Cultural History Field Trips
- 3** Environmental Studies
- 4** Environmental Living
- 5** Junior Rangers
- 6** Litter-Getters
- 7** Junior Lifeguards
- 8** Other

Adapted from <http://parks.ca.gov>

Appendix C

Elkhorn Slough Safari
O’Niell Sea Odyssey
The Banana Slug String Band
Friends of the Sea otter
Seymour Center
Monterey Bay Aquarium

**This is a sample of some of the materials. Not all materials are included in this portfolio because most of them are 10+ pages and difficult to reproduce.*

Elkhorn Slough Safari



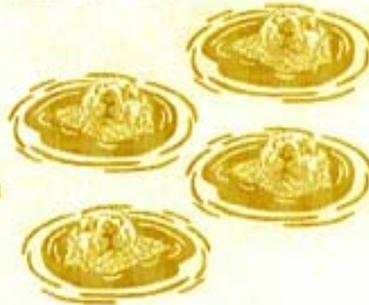
Attention Teachers:

FLOATING CLASSROOM!

Make one of California's largest wetlands your classroom! Come aboard a Coast Guard certified pontoon boat for a 2 hour program. You and your class can enjoy learning about various aspects of coastal wetlands ecology at the Elkhorn Slough on a fully guided tour.

The Elkhorn Slough is a wildlife-rich reserve which winds inland seven miles. It provides an important feeding and resting place for a wide variety of wildlife, such as, harbor seals, sea otters, and thousands of birds.

- Trips available for:
 - Grades 3 through 6 &
 - High school science excursions
- Space available for 23 students, plus 2 required chaperones per tour
- Age appropriate activities led by on board naturalist



Advance Reservations Required.

**Call Elkhorn Slough Safari at (831) 633-5555
for dates, background, and fee information**

Lifejackets provided for each student.
Boat operated by Coast Guard certified captain.

O'Neill Sea Odyssey

Program Overview

The Sea Odyssey program is a 3-hour learning experience that takes place aboard the 65-foot Team O'Neill catamaran with follow-up lessons at the shore-side Education Center. Each group is split into 3 sub-groups, which rotate through three stations: Marine Biology, Ecology and Navigation. Below is a general outline of the program, followed by the expected outcomes.

PROGRAM BEGINS

An OSO Instructor meets the group to escort them to the classroom for orientation Introduction to the program: each of the three instructors gives a brief overview of the station they teach and introduces themselves to the students. Group puts on lifejackets and boards the Team O'Neill catamaran. Once aboard a safety talk is given concerning boat rules and safe boating behavior. Hoist main sail: Students learn the importance of teamwork and cooperation while raising the main sail on the Catamaran.

3 Station Educational Format begins - 3 groups, 15 minute stations

Station 1 - Sailing and Navigation

Learn about electronic technology for navigation, triangulation, line-of-sight, use of magnetic handheld compasses, and other elements of navigation. Students use hand-held compasses to take 3 bearings on local landmarks. This information is recorded on a datasheet along with readings of wind speed, weather and depth as it relates to oceanic charts.

Station 2 - Ecology

Learn information about the Monterey Bay Sanctuary's characteristics and marine life and habitats. Discussion includes the kelp forest, marine mammals, human influence on our marine habitat and related ecosystems, threats to the bay, and ideas for conservation and preservation. Visual aids are used to emphasize concepts. A water sample is taken to learn about pH. On the way back to the harbor, students count the number of otters in Black's Beach kelp forest and record this information on their data sheet.

Station 3 - Marine Biology

Discussion includes the life cycles of plankton, their role in the food web and the unique chemical and physical balance that helps maintain life in the sea. Students participate in a plankton tow and the specimen is taken back to the classroom for further examination. A water sample is also taken back to test its salinity using a refractometer.

Return to Classroom - 3 station format continues

Station 1 - Sailing and Navigation

The bearings taken on the boat are then plotted onto a chart of the Monterey Bay. Students learn how to read and decipher the signs, symbols and measurements on navigational charts. The class includes an introduction to navigational tools such as parallel rulers, globes and the compass rose. The instructor discusses latitude, longitude, and basic geometry as it relates to triangulation and other elements of navigation.

Station 2 - Ecology

An overview of the water cycle and watersheds is given. The water sample is tested for pH and the affects of pH on the ecosystem are discussed. Students discuss storm drains

and how they relate to ocean pollution. Using a watershed model, examples of point source and non-point source pollution are demonstrated. Students are encouraged to conceptualize solutions to current environmental problems including landfill diversion, organic farming, reducing, reusing, recycling and alternate forms of transportation and energy.

Station 3 - Marine Biology

The samples from the plankton tow gathered on boat are viewed through a microscope that is connected to a large-screen monitor. Students participate in plankton identification and discuss the different types of phytoplankton and zooplankton collected. A refractometer is used to test water salinity and the results are explained to the class. Instructors discuss factors relating to the variation in salinity and how the food chain can be affected.

3-station format ends

The instructors lead a final discussion and question and answer session

END OF PROGRAM

Follow up activities are provided in the Teacher Packet and follow up information, including the data taken during the program, is available through the Sea Odyssey web site in the Learning Center.

Banana Slug String Band

KEEPING THE MAGIC ALIVE WORKSHOP **by STEVE VAN ZANDT for THE AEOE 2003 SPRING CONFERENCE** **JONES GULCH, LA HONDA, CA.** **APRIL 4-6, 2003**

WORKSHOP OUTLINE

INTO the activities:

· Getting partners; Hello partner I think you're cool. High five. Thumb wrestle, finger fence. Share a magical moment as a teacher or as a learner

THROUGH the activities:

· Rule of thumb; get involved with the environment right away. Prickly Tickle.

· Finding the hearts and picking the brains. Stories of inspiration and magic; Mrs. T, (reverence and vocal dynamic) Cornell (Joy, centered, gems), Chuck's Puddle (knowing your back yard), Trout Black (new perspectives, naturalist's naturalist).

· Embedding; Step in Step out, Live for The Moment, Burned out club, finger listen/coyote ears.

· Into, Through, Beyond; student outcomes, guided practice (call & find, camera), backward planning

- Delivery Systems; Cycle Frisbee (focal center), plant mountain lion, food chain cards, food pyramid, mystery jars, miracle of life, fog
- Framing; licking drops, thank you plant, fir needles, gopher dirt, backward framing
- Learning the same thing in different ways; Concepts followed with interactions: Change Artists, "decompose", grandfathers bones, red tailed hawk, smell 3 layers of decomposing, decomp dance
- Ownership; Little Miracles
- Kinesthetic Focusers; yerba buena, fir/redwood and the big 5 club, TV-Hawk, harbor seal /sea lion, Thank you green plants.
- Process Approach; Experiencing nature techniques, Outdoor ed axiom, slow kids down, change perspectives, silencing, immersion, micro to macro, emotional impact (eye centering, 3 layers of the creek, waterfall, 5 second survey, Concert, strange planet, spokes)
- A look at the classics: Find A Tree, Burma shave, Professor Hike, webbing, duplication, magic spots, etc.
- Grabbers & Clubs
- The power of poetry; Blade of grass, Old Woman

BEYOND the activities:

- Make a commitment that next week you will use a new activity from this workshop or create a new activity inspired by this workshop

Friends of the Sea Otter

An Example of a Middle School Presentation

FSO'S IN-SCHOOL SEA OTTER PROGRAM

CLASS OUTLINE (60 minutes)

1) INTRODUCTION (5 minutes): FSO's mission and definition of key words such as habitat, ecosystem, adaptation, mammals, and threatened species (varies with age groups).

2) POWERPOINT PRESENTATION (15 minutes): Students enter the underwater world of sea otters, learning about natural history, behavior, anatomical adaptations, foraging, tool use, survival and the importance of sea otters as a "keystone species." Students learn how to observe and study sea otters in the wild and how they can help save sea otters from extinction. Other topics include conservation, plastic pollution, cleaning beaches, recycling oil, storm drains, and calling stranding networks.

3) TWO STATIONS (25 minutes total, 2 groups @ 12.5 minutes each):

FEEDING STATION: Students further explore the meaning of "keystone species" and how otters find and capture food. A sea otter skull, complete with a full-set of teeth, is used to demonstrate their adaptations to feed on their armored prey. Students are shown a variety of prey eaten by sea otters and how they use tools to open them, thus demonstrating their creativity and intelligence. A biomagnification demonstration describes the effects of pollution and contaminants, and highlights their sensitive ecosystems living so close to the ocean's coast.

Artifacts & props used:

- Prey items including large Gaper & Washington clams, mussels, crabs, sea urchins, sea stars, and turbin snails (Preserved innkeeper worms and squid are in preparation for class use.)
- Sea otter skull (plastic).
- Demonstration of various tool users, including humans.
- Pollution and biomagnification demonstration.
- Pictures & diagrams showing prey in natural settings, kelp forest with & without the benefit of sea otters, etc.

SURVIVAL STATION: Students learn about the anatomy of sea otters, swimming locomotion, and the process and purpose of grooming. They are shown the importance of staying warm and the dangerous effects of pollution on sea otters' fur. Students' learn how they can help and their self-awareness is engaged as they discover that the survival of the sea otter depends on them.

Artifacts & props used:

- Sea otter pelts, from pups to adults. Discuss how they keep warm using air bubble wrap demonstration.

- Students put their hands directly in cold water vs. insulated by air bag (in preparation).
- Sea otter skeleton (in preparation).
- Habitat model & oil demonstration (vegetable oil & food coloring).
- Pictures & diagrams showing the density of sea otter fur and how air is trapped oiled otters, storm drains, etc.

4) OTTER COSTUME (10 minutes): We dress up and transform one student into a sea otter, starting with skin and adding fur, webbed feet, arm muscles, paws with retractable claws, and a head complete with teeth, ears, whiskers, and a nose. This very entertaining demonstration addresses sea otter adaptations and their differences from other marine mammals that use blubber to keep warm, stressing the vulnerability of sea otter fur, and reinforcing their protection from pollution and other hazards in the ocean.

5) WRAP-UP (5 minutes): Question and answer session, and we ask the students to give us feedback on the program by drawing pictures and writing short stories about what they have learned.

6) EXTRACURRICULAR PACKET: Each teacher representing a class or grade level is given a packet that includes FSO membership information, "How They Can Help?" pamphlets, contact numbers for the local Marine Mammal Stranding Network, and a list of books, website links, activities, and so on. We encourage teachers to support FSO by signing up for a classroom membership to get more information to further enrich students' understanding and involvement with the much-loved sea otter .

Seymour Center

Asking Questions Chaperone Activities

(Aquarium and seawater table/touch tank area)

(Kindergarten - Grade 4)

Scientists are curious. They ask all kinds of questions and want to find answers. Let's explore some of the questions scientists ask...

****NOTE: RESERVED, DOCENT-LED SCHOOL TOURS OFTEN STOP AT THE SEAWATER TABLE/TOUCH TANK FROM 10:00 – 10:30 AM and 12:00 – 12:30 PM. IF ONE OF THESE TOURS ARRIVES WHEN YOUR GROUP IS AT THE SEAWATER TABLE, PLEASE MOVE YOUR GROUP INTO THE AQUARIUM SECTION. THANK YOU FOR YOUR COOPERATION.**

The following activities are designed for the aquarium section, but can be adapted to the seawater table/touch tank.

Curious creatures

1. Keep the children in a small group and look at the aquarium displays one at a time. At each aquarium, ask what they see/observe.
2. Ask what types of questions scientists might ask when they see these creatures. Use the exhibit text at each aquarium to discuss questions and possible answers.

Camouflaged critters

1. Ask students to find the “Sandy Seafloor” tank.
2. Ask if anyone knows what it means if an animal is camouflaged. Discuss that many animals are able to blend in to their surroundings—by color, shape, behaviors—to hide. This helps them stay alive.
3. Which animals are well camouflaged to hide on the sandy seafloor? Discuss how the tiny sand dabs and skates are flat and match the sand color. Is the guitarfish burying itself in the sand to help blend in?
4. Look for other examples of camouflage they can find in the other tanks. Discuss what helps them blend in—is it color, shape, behavior, a combination? How many examples can you find?

Asking Questions Chaperone Activities

(Aquarium and seawater table/touch tank area)

(Grade 4-7)

Scientists are curious. They ask all kinds of questions and want to find answers. Let’s explore some of the questions scientists ask...

****NOTE: RESERVED, DOCENT-LED SCHOOL TOURS OFTEN STOP AT THE SEAWATER TABLE/TOUCH TANK FROM 10:00 – 10:30 AM and 12:00 – 12:30 PM. IF ONE OF THESE TOURS ARRIVES WHEN YOUR GROUP IS AT THE SEAWATER TABLE, PLEASE MOVE YOUR GROUP INTO THE AQUARIUM SECTION. THANK YOU FOR YOUR COOPERATION.**

The following activities are designed for the aquarium section, but can be adapted to the seawater table/touch tank.

Aquarium quiz

1. Read: Here in the aquarium are not only lots of marine creatures, but lots of questions. Scientists are very curious about the different things you’ll see here. Your mission is to work in groups of two or three to spend some time looking at each tank. Read the question and answer you find on each tank. Be ready to share your favorite tanks and their questions with the whole group.
2. Tell students the rule about the seawater table in case a docent-led tour arrives. If your group spends time at the seawater table, you as chaperone need to be carefully supervising them for appropriate and gentle handling behavior.
3. Give students a time limit (say 6-8 minutes depending on your schedule) and tell them to meet in front of the “Sandy Seafloor” tank to share their favorites.
4. After the time limit is up, ask students to share their favorites and why.

Masters of camouflage

1. Start at the “Sandy Seafloor” tank.
2. Ask what it means if an animal is camouflaged. Discuss that many animals are able to blend in to their surroundings—by color, shape, behaviors—to hide. This adaptation helps them survive by hiding from predators or sneaking up on prey animals.
3. Use one of the animals in the Sandy Seafloor tank as an example. Discuss with students what helps the animal you selected camouflage—color (like sand)?, shape (flat to blend with bottom)?, behavior (does it bury itself in the sand)?
4. Their mission is to look for the many other examples of camouflage they can find. They should try to figure out what helps each found example to be camouflaged — color, shape, behavior, a combination? They can work in groups of 2-3.
5. Set a time limit and meet back at the Sandy Seafloor tank to discuss their findings.

Monterey Bay Aquarium

Number Search in Monterey Bay Aquarium

Activity Description

Animals have different numbers of body parts. Some animals have one foot, some have two shells, some have five rays, some have eight legs, and more. On a trip to the aquarium, students search for an animal with body parts for each number from one to ten. They can count rays, fins, feet, gills, eyes, spots or anything. When they get back to school, students can compile their findings and make an aquarium counting-book or display.

Materials

- Objects for counting (crayons, unifex cubes or bottle caps)
- Close-up pictures of animals
- Index cards for chaperones to record student observations
- Poster paper and markers (optional)
- Paper, crayons and art supplies for making mini-books (optional)

Directions

1. Before the trip to the aquarium, review various counting activities with the students.
2. Look at pictures of animals in books, from recycled calendars and magazines or on the aquarium web site.

Do any of the animals have one of a body part? Have the students share the name of the animal and its single body part, such as, "The dog has one tail." Record the students' observations and continue, looking for two, three and more body parts.

3. On their visit to the aquarium, challenge the students to find an animal with body parts for each of the numbers from one to ten. (1 tail, head, mouth, spine, or... and 2 eyes, flippers, ears, legs, or...) Ask chaperones to record the students' findings, such as "The leopard shark has one tail. The clam has two shells." Record the students' observations and continue, looking for two, three and more body parts.
4. When you return to school, make mini-books or a word wall with the results from the Number Search.

Resources

Read *One Nighttime Sea* by Deborah Lee Rose

Read *One Less Fish* by Kim Michelle Toft and Allan Sheather

Read *Fish Counting* by Arthur David Zoller

Extensions

- Back in the classroom, students can make a bar graph or class chart of animals they discovered in the aquarium.
- Do a number search in nature in the schoolyard, nearby park or at home.

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http://www.montereybayaquarium.org/lc/teachers_place/youth_programs_activities.asp

ABC Search in Monterey Bay Aquarium

Activity Description

On a trip to the aquarium, students search for an animal or algae for each letter of the alphabet. When they get back to school, they can make an aquarium mini-book or class dictionary.

Materials

- Notepaper to record the results of the ABC Search in the aquarium
- Paper, crayons and art supplies for making mini-books
- Class word banks or individual student dictionary

Directions

1. Before the visit to the aquarium, read an alphabet book with the students and talk about beginning sounds.
2. Explore the aquarium web site and look for pictures of animals the students may see on their trip.
3. While visiting the aquarium, challenge the students to find animals or plants for each letter of the alphabet. Ask chaperones to record the students' findings.
4. When you return to school, make mini-books or a word wall with the results from the ABC Search.

Resources

Read *A Swim through the Sea* by Kristin Joy Pratt

Read *Into the A, B, Sea* by Deborah Lee Rose

Extensions

- Make an ABC aquarium mini-book or add discoveries to your dictionary.
- Draw pictures of your favorite animals and plants or do some research to complete the alphabet. Make up an imaginary animal or plant if you are stuck on hard letters like Q or X, or add other things you saw at the aquarium like V for volunteer.
- Display your animal and plant alphabet pictures on a wall or in a word bank.

© MONTEREY BAY A Q U A R I U M

http://www.montereybayaquarium.org/lc/teachers_place/youth_programs_activities.asp

Appendix D

***Monterey Bay
Sanctuary Foundation***

*299 Foam Street
Monterey, CA 93940
831-647-4209
Fax 831-647-4244*

Dear Education colleague,

The Monterey Bay National Marine Sanctuary (MBNMS) is working in partnership with the City of Santa Cruz, the National Marine Sanctuary Foundation, and the Monterey Bay Sanctuary Foundation to design and construct Monterey Bay National Marine Sanctuary Visitor and Education Center. We are asking local educators, via the attached survey, to provide input regarding the programs that will be offered at the Center.

The 16,000 square foot MBNMS Visitor Center and Education Facility will be located on the corner of Beach and Pacific Streets in downtown Santa Cruz, adjacent to the beach boardwalk at what is now called the “Fun Spot” skate park. The MBNMS Visitor Center includes a 1,000 square foot, state-of-the-art, teaching classroom and MBNMS staff plan to offer science-based programs for students and teachers in Santa Cruz and Monterey counties about issues impacting oceans. One of our goals is to complement, and not duplicate, programs that are currently offered at other educational institutions in our area.

Your feedback will be very helpful in program planning for the Center and will also help a California State University Monterey Bay student to finish her capstone project. We thank you in advance for your time and for your timely return of this survey. If you choose to write your name on the survey, which is optional, you will be entered into a raffle to win curriculum materials, posters, and CDs from NOAA.

To learn more about current plans for the MBNMS Visitor and Education Facility, please visit <http://montereybay.noaa.gov/visitorcenter/welcome.html>

Please use the envelope included to return this survey. If you have any questions about this survey or the visitor’s center project, please call Tera Farnsworth at 831-883-9582 or Stacia Fletcher at 831-420-1630.

Thank you again for your time and for your feedback,



Stacia Fletcher
MBNMS Educator



Tera Farnsworth
CSUMB student

Name (Optional) _____ **School** _____
Grade level(s) _____

Survey questions related to programs and materials:

1. To help us determine what types of programs to offer at the MBNMS Visitor Center, please rank the following types of programs on a scale from 1 to 3 using the ranking criteria listed below.
1= program is highly needed or desired in this area; 2= program would be nice to have in this area; 3= program not needed or desired in this area.

 (A) Standards-based classroom programs for students at the Center about ocean issues
 (B) Standards-based outdoor programs for students near the Center (at the beach, Neary lagoon, wharf, etc.)
 (C) Standards-based student programs at your school
 (D) Teacher professional development programs (eight hours or less in length)
 (E) Teacher professional development programs offered for graduate credit
 (F) After-school programs for students
 (G) Summer camp programs for students
 (H) Community-based programs for audiences of all ages
 (I) Family-based programs
2. To help us determine what types of educational resource materials to provide through the MBNMS Visitor Center, please rank the following materials on a scale from 1 to 3 using the ranking criteria listed below.
1= materials are highly needed in the area; 2= materials would be nice to have in this area; 3= materials not needed or desired in this area

 (AA) Standards-based K-5 curriculum materials related to ocean issues
 (BB) Standards-based 6-12 curriculum materials related to ocean issues
 (CC) Maps and/or photographs for use in classrooms
 (DD) Web-based activities for students to do on-line
 (EE) Downloadable activities for students to do while visiting the Center
 (FF) Posters for use in classrooms

- (GG) Informational brochures targeted to students on ocean issues
- (HH) Informational brochures targeted to adults and teachers on ocean issues

3. Do you teach topics related to Marine Science or the MBNMS? **Circle one:** Yes No
-If so, please describe briefly.

4. What topics/concepts would you like to see covered in programs for students in:

K-2?

3-5?

6-8?

9-12?

5. If the MBNMS were to offer a summer graduate level course for teachers, involving curriculum and program planning elements for the MBNMS Visitor Center, would you be interested in attending?

Circle one: Yes No

6. Using a scale of 1 to 7, when would you be most likely to attend a teacher program of three-hours or less offered during the academic school year?
1=most likely to attend and 7= least likely to attend

Monday evening

Friday evening

Tuesday evening

Saturday morning

Wednesday evening

Saturday afternoon

Thursday evening

Survey questions related to field trips and field trip logistics:

7. Do you typically take your students on field trips?

Circle one: Yes No

-If not, why don't you take students on field trips?

-If so, where do you typically take students on field trips?

-Why do you choose those sites as a field trip destination?

8. What would be the earliest time your class could arrive at the MBNMS Visitor Center to be located in downtown Santa Cruz at the corner of Beach and Pacific Streets? _____
9. What would be the latest time your class could depart from the MBNMS Visitor Center so they arrive back at school prior to bus departures?

10. If we offer programs 45 minutes to one-hour in length (grade level dependent), what would be optimum start times for programs to be offered at the MBNMS Visitor Center? **Circle all that apply.**

9am 9:30am 10am 10:30am 11am 11:30am
12pm 12:30pm

11. Please complete the following sentence. A really great exhibit in the MBNMS Education Center would be one that.....

Survey questions related to cultural issues:

12. What percentage of students in your class are English Language Learners (ELL or ESL)?
13. When you take your students on field trips do you feel as though the programs/exhibits are geared for a multi-cultural audience?

Circle one: Yes No

-If yes, why and give examples if possible?

-If no, why not and give examples if possible?

14. Which of the following would best meet the needs of your students?

Circle one:

Programs and materials offered in English

Programs and materials offered in English with programs using sheltered teaching techniques

Programs and materials offered in Spanish

Programs and materials offered in English and Spanish

Thank you for filling this out and we appreciate your timely return of this survey.

****By returning this survey you are consenting to let your information be used by Tera Farnsworth of CSUMB and the Monterey Bay Sanctuary Foundation. ****

Feel free to provide any additional comments in the space provided below.

Appendix E

School/District	Principal	Address	City	Zip	Phone
BONNY DOON UNION ELEMENTARY (K-6)	Lana Fawcett	1492 Pine Flat	Santa Cruz	95060	427-2300
HAPPY VALLEY ELEMENTARY (K-6)	Chris McGriff	3125 Branciforte Drive	Santa Cruz	95065	429-1456
LIVE OAK SCHOOL DISTRICT					
Del Mar Elementary School (K-5)	Robert Greenlee	1959 Merrill St.	Santa Cruz	95062	477-2063
Green Acres Elementary School (K-5)	Douglas Fritsch	966 Bostwick Ln	Santa Cruz	95062	475-0111
Live Oak Elementary School (K-5)	Deborah Wilson	1916 Capitola Rd.	Santa Cruz	95062	475-2000
Ocean Alternative Education (K-8)	David Paine	984-6 Bostwick Lane	Santa Cruz	95062	475-0767
Tierra Pacifica Charter (K-8)	Linda Lambdin	2008 17th Avenue	Santa Cruz	95062	462-9404
Shoreline Middle School (6-8)	Kathleen Slowiczek, Ed. D.	855 - 17th Avenue	Santa Cruz	95062	475-6565
Cypress Charter High School (9-12)	Les Forster	1959 Merrill St.	Santa Cruz	95062	477-0302
MOUNTAIN ELEMENTARY (K-6)	Edith Edwards	3042 Old San Jose Rd	Soquel	95073	475-6812
PACIFIC ELEMENTARY (K-6)	Sharon Smith	P. O. Box H	Davenport	95017	425-7002
PAJARO VALLEY UNIFIED SCHOOL DIST.					
Alianza Charter School (K-5)	Michael Jones	115 Casserly Road	Watsonville	95076	728-6333
Amesti Elementary School (K-5)	Shari Gallegos	25 Amesti Rd.	Watsonville	95076	728-6250
Ann Soldo Elementary School (K-5)	Sharon Peterson	1140 Menasco Drive	Watsonville	95076	786-1310
Bradley Elementary School (K-6)	Kathy Arola	321 Corralitos Rd.	Watsonville	95076	728-6366
Calabasas Elementary School (K-6)	Lisa Reynolds	202 Calabasas Rd.	Watsonville	95076	728-6368
Freedom Elementary School (K-5)	Jean Gottlob	25 Holly Dr.	Freedom	95019	728-6260
H. A. Hyde Elementary School (K-5)	Sylvia Mendez	125 Alta Vista	Watsonville	95076	728-6243
Hall District (K-6)	Marilyn Frandeen	300 Sill Rd.	Watsonville	95076	728-6371
Landmark Elementary School (K-5)	Terry Eastman	235 Ohlone Parkway	Watsonville	95076	761-7940
MacQuiddy Elementary School (K-5)	Jack Davidson	330 Martinelli	Watsonville	95076	728-6315
Mar Vista Elementary School (K-6)	Karen Hendricks	6860 Soquel Drive	Aptos	95003	688-5211
Mintie White Elementary School (K-5)	Olga de Santa Ana	515 Palm Ave	Watsonville	95076	728-6321

Ohlone Elementary School (K-5)	Rafael Ramirez	21 Bay Farms Rd.	Watsonville	95076	728-6977
Radcliffe Elementary School (K-5)	Bob Rasmussen	550 Rodriguez Street	Watsonville	95076	728-6469 x369
Rio Del Mar Elementary School (K-6)	Mike Heffner	819 Pinehurst Dr.	Aptos	95003	688-2053
Starlight Elementary School (K-5)	Erin Haley	225 Hammer Ln.	Watsonville	95076	728-6979
Valencia Elementary School (K-6)	Mary Gaukel	250 Aptos School Rd.	Aptos	95003	688-2013
Linscott Charter School (K-8)	Robin Higbee	220 Elm St.	Watsonville	95076	728-6301
Pacific Coast Charter School (K-12)	Vicki Carr	294 Green Valley Rd	Watsonville	95076	786-2180
Watsonville Charter Schools of Art (K-8)	Sue Forson	115 Casserly	Watsonville	95076	728-8123
Aptos Junior High School (7-8)	Ray Blute	1001 Huntington Dr.	Aptos	95003	688-3234
E. A. Hall Middle School (6-8)	Ian MacGregor	201 Brewington Ave.	Watsonville	95076	728-6270
Lakeview Middle School [6-8]	Casey O'Brien	2350 E. Lake Ave.	Watsonville	95076	728-6454
Pajaro Middle School (6-8)	Jacqueline Defendis	250 Salinas Rd.	Watsonville	95076	728-6238
Rolling Hills Middle School (6-8)	Rick Desimone	130 Herman Ave.	Watsonville	95076	728-6341
Academic/Vocational Charter Institute	TBD	294 Green Valley Rd	Watsonville	95076	786-2100 x585
Aptos High School (9-12)	Diane Burbank	7301 Freedom Blvd.	Aptos	95003	688-6565
Pajaro Valley High School (9-12)	Pancho Rodriguez	440 Arthur Road	Watsonville	95076	728-8102
Renaissance High School (9-12)	Robb Mayeda	11 Spring Valley Rd.	Watsonville	95076	728-6344
Watsonville High School (9-12)	Cec Bell	250 E. Beach St.	Watsonville	95076	728-6390
SAN LORENZO VALLEY UNIF. SCH. DIST.					
Boulder Creek Elementary School (K-6)	Lynn Chappell	400 Lomond Street	Boulder Creek	95006	338-6413
San Lorenzo Valley Elementary School (K-6)	Michelle McKinny	7155 Highway 9	Felton	95018	335-4475
San Lorenzo Valley Junior High School (7-8)	Chris Mercer	7179 Hacienda Way	Felton	95018	335-4452
San Lorenzo Valley High School (9-12)	Valerie Pitts	7105 Highway 9	Felton	95018	335-4425
SLVUSD Charter Programs	Eric Schoffstall	325 Marion Avenue	Ben Lomond	95005	336-1827
SANTA CRUZ CITY SCHOOL DISTRICT					
Bay View Elementary School (K-5)	Dan Cavanaugh	1231 Bay St.	Santa Cruz	95060	429-3991
De Laveaga Elementary	David Freed	1145 Morrissey	Santa Cruz	95065	429-3807

School (K-5)		Blvd.	Cruz		
Gault Elementary School (K-5)	Mary Anne James	1320 Seabright Ave.	Santa Cruz	95062	429-3856
Monarch School (K-5)	Curt Coleman	840 Branciforte Avenue	Santa Cruz	95062	429-3898
Westlake Elementary School (K-5)	Ken Miller	1000 High Street	Santa Cruz	95060	429-3878
Branciforte Middle School (6-8)	David Bilardello	315 Poplar St.	Santa Cruz	95062	429-3883
Mission Hill Middle School (6-8)	Bryan Wall	425 King St.	Santa Cruz	95060	429-3859
Ark Independent Study (9-12)	Curt Coleman	840 N. Branciforte Avenue	Santa Cruz	95062	429-3898
Costanoa Continuation High(9-12)	Curt Coleman	840 N. Branciforte Avenue	Santa Cruz	95062	429-3898
Delta High School (Charter) (9-12)	Bob Guzley	6500 Soquel Drive	Aptos	95063	477-5212
Harbor High School (9-12)	Nancy Tocchini	300 La Fonda Ave.	Santa Cruz	95065	429-3810
Santa Cruz High School (9-12)	Karen Edmunds	415 Walnut St.	Santa Cruz	95060	429-3960
Soquel High School (9-12)	Jennifer Kollmann	401 Old San Jose Rd.	Soquel	95073	429-3909
Alternative Family Education (K-12)	Curt Coleman	840 N. Branciforte Avenue	Santa Cruz	95062	429-3898
SCOTTS VALLEY UNIFIED SCHOOL DIST.					
Brook Knoll Elementary School (K-5)	Kathy Frandle	151 Brook Knoll Dr.	Santa Cruz	95060	423-2454
Vine Hill Elementary School (K-5)	Kathy Dunton	151 Vine Hill School Road	Scotts Valley	95066	438-1090
Scotts Valley Middle School (6-8)	Mary Lonhart	8 Bean Creek Rd.	Scotts Valley	95066	438-0610
Scotts Valley High School (9-12)	Nancy Serigstad	555 Glenwood Drive	Scotts Valley	95066	439-9555
SOQUEL UNION ELEM. SCHOOL DISTRICT					
Main Street Elementary School (K-5)	Thom Dunks	3430 North Main St.	Soquel	95073	464-5650
Santa Cruz Gardens Elementary School (K-5)	Alicia Escobar	8005 Winkle Ave.	Santa Cruz	95065	464-5670
Soquel Elementary School (K-5)	Carl Pearson	2700 Porter St.	Soquel	95073	464-5655
New Brighton Middle School (6-8)	Sydney Renwick	250 Washburn Ave.	Capitol a	95010	464-5660
Pacific Collegiate Charter School	Jan Keating	P.O. Box 1701	Santa Cruz	95061	479-7785

Appendix F

Question #3 – Do you teach topics related to Marine Science or the MBNMS?

- If so please describe briefly.

“Animal habitats in the 1st grade. We do a field trip to Long Marine Lab & study adaptations that sea animals have.” – Dana Schmidt, Westlake Elem, 1st grade

“Unit on oceans, oceanography, field trips to local tide pools, current events related to MBNMS.” – Steve Seffinger, Happy Valley Elem., 4/5th grade

“Sea mammals, rocky shore.” - 2nd grade staff, Westlake Elem.

“MBNMS ecology in conjunction with Seymour Discovery Center and Oneill Sea Odyssey, M.B. Salmon & Steelhead Trout Project – Steward Steelhead eggs as hatch & develop them “return” to the river, curriculum “attached,” General mammals study, which includes sea mammals” – Jane Heyse, Westlake Elem., 4th grade

“At the 2nd grade level sea animals is usually the focus of continents of the surrounding oceans” – Marsha Isaacson, De LaVeaga Elem., SDC 1-3

“Study of ocean mammals, river theme, watershed, habitat.” – Pam Hernandez, Gault Elem., 2nd grade

“2 month unit on fish and ocean animals, ocean ecology, marine habitats” – C. Ledwich, Gault Elem, 2nd grade

“Ocean unit, water unit, water cycle, life cycles, Planton → whales, adaptations for diff. zones maintaining the cleanliness of marine environment.” – Cata Fitzgerald, Gault Elem, Kindergarten

“Ocean unit in kindergarten w/emphasis on conservations & exploration of our sanctuary.” – Sugihara, Bay View Elem., Kindergarten

“Ocean writing unit exploring tide pool, deep ocean, and kelp forest” – J. Johnston, Bay View Elem., 4th grade

“We raise steelhead trout (STEP Program) and study the San Lorenzo River Watershed/Monterey Bay all year.” – Barbara Novelli, Bay View Elem. 4/5th grade

“Tide pool life – I’m keeping it to just tide pool life this year, but may expand to ocean life if a straight 2nd next year.” – Earlene Matteson, Bay View Elem., 2nd grade

“Biology – I do a unit on ecology and want to include active, hands-on activities that are local. Students using real tools & doing real work that makes a difference or seems meaningful is important.” – Tamara Myers, Costanoa H.S., 9-12

“I teach the STEP (Salmon & Trout Education Program) to 6th graders in the spring.” – Jean Mahoney, B-40 middle school, 6th grade

“Water unit, conservation, adaptations.” – De Laveaga Elem., 5th grade

“Ecosystems, food webs, CA Explorers (in the bay), CA History.” – Holly Butler, De Laveaga, 4th grade

“Ecosystems – includes web of ocean life habitat.” – Alison Woolpert, De Laveaga, 4th grade

“Water cycle, water conservation, ocean life.” – Maen Presleigh/Debbie Smith, De Laveaga Elem., 3rd grade

Question 4 – What topics/concepts would you like to see covered for students in: k-2? 3-5? 6-8? 9-12?

K-2: “Environment – keeping it clean. Any & all sea life, plus sea birds.” – Dana Schmidt, Westlake Elem, 1st grade

“Life cycles, conservation.” – 2nd grade staff, Westlake Elem, 2nd grade

“Sea animals.” – Marsha Isaacson, De Laveaga, SDC 1-3

“All ocean subjects – animals, ecosystems, life cycles.” – Gault Elem.

“Habitat, watershed.” – Pam Hernandez, Gault Elem., 2nd grade

“Deep sea adaptations, shark info, plankton & food cycles, tide pools.” – Cata Fitzgerald, Gault Elem., K

“Preserving our oceans, tide-pool life.” – Sugihara, Bay View Elem., K

“What is a watershed? Our local ecosystem.” – Barbara Novelli, Bay View Elem., 4/5

“Tide pool life – How to keep the ocean clean. Habitats & life cycles.” – Earlene Matteson, Bay View Elem., 2nd

3-5: “Environmental awareness of overfishing, pollution, global warming, mercury poisoning. Plants: kelp forests (5th grade standard).” – James Smith, Westlake Elem, 5th grade

“Physical characteristics of Monterey Bay landforms (underwater canyons, etc., shifting beach sand). How enviro-friendly habits help the bay vs. poor habits.” – Jane Heyse, Westlake Elem.1, 4th grade

“Pollution, water, sea/animal.” – J. Johnston, Bay View Elem., 4th grade

“Water quality issues, continue watershed mapping, developing LOCAV, service learning projects focused on local creeks/river/shorelines/beaches.” – Barbara Novelli, Bay View Elem. 4/5

“Ecology (good format from O’Niell Sea Odyssey). Local history of bay use (include whaling, any smuggling?, etc.) similar to talks “colorful characters” in Evergreen cemetery.” - Holly Butler, De Laveaga, 4th

“Ocean – part of “ecosystem unit”, interdependence: habitat, health of h2o, food chain, possibly: rocks/minerals unit, sand – what is it?, cliffs – how formed..., what made of...” - Alison Woolpert, De Laveaga, 4th

6-8: “Stewardship in the Sanctuary” – Jean Mahoney, B-40 Middle, 6th

9-12: “Mammal rescue & issues/concerns, invertebrate studies, shark biology, whale evolution, careers in oceanography” – Tamara Myers, Costanoa H.S., 9-12

Question #7 – Do you typically take your students on field trips? If not, why don’t you take students on field trips? If so, where do you typically take students on field trips? Why do you choose those sites as a field trip destination?

-If not, why?

Difficult to get away from school with Middle school kids

-If so, where?

Pumpkin patch - 1

Museums - 3

- Santa Cruz Natural History Museum – 3
- Maritime Museum - 1
- Monterey Custom House - 1
- Whale Beach & Museum – 1
- Museum of Art & History – 2
- Tech Museum – 1
- Oakland Museum - 1

Performances at Cabrillo College - 2

Trader Joes - 1

The Public Library - 1

Wilder Ranch - 5

Johnson’s Farm - 4

Long Marine Lab – 4

- Seymour Discovery Center - 6

Beach - 3
- Capitola Beach - 1
- Tide Pools – 1
- Seacliff Beach – 2
- Henry Cowell - 2
Natural Bridges - 5
Ano Nuevo - 5
Missions
- Carmel - 2
- Santa Cruz – 1
- San Juan Bautista - 2
Oniell Sea Odyssey – 4
UCSC Farm & Garden – 2
Monterey Bay Aquarium – 6
Sacramento – 1
San Lorenzo River to return Steelhead eggs – 1
San Jose Discovery Center – 1
Rollerskating – 1
Yesterday’s Farm - 2
Elkhorn Slough - 2
Firestation – 1
Hospital – 1
Rivers - 1
Loch Lomond – 1
Water Treatment Plant – 1
Gymnastics Center – 1
Dennis the Menace Park - 1
Winchester Mystery House – 1
SF Pacific Edge – 1
Neary Lagoon Wetlands – 1
Historic Monterey – 1
Santa Cruz County Fair - 1

-Why?

Enrichment - 2
Fun - 2
Local History - 1
Meets grade level standards - 3
Develops an awareness of environmental issues - 1
Part of curriculum – 9
Experience – 3
Proximity – 2
Connection of Watershed Issues - 1
Free admission – 1
Good Displays – 1
Helpful teacher prep. Info – 1

Related to Science/History of California – 1

Question #11 – Please complete the following sentence. A really great exhibit in the MBNMS Education Center would be one that...

“has ‘hands-on’ activities to engage all learners”

“demonstrates to children and the community the relevance of the sanctuary and the need to maintain and protect it.”

“incorporates grade level standards and environmental consciousness”

“is interactive”

“showed a big 3-d map of the land under the bay and discussed formation of the bay & habitats created by the various depths and currents”

“is interactive/hands-on or involved in live animals”

“hands-on for the children, easy to use/manipulate”

“some hands on activity”

“had a hands-on component, adults to help (bilingual)”

“children can interact with and will provide conservation information for all visitors”

“engages kids in hands-on science, inquiry process, and leaves them with a plan for a service learning project”

“is hands on”

“is visually rich, information that is easy to read, meaningful to students lives, has possibility for discussion questions in classroom, interactive & high interest for students”

“has the student interest with the ocean waves (simulated)”

“encourages students to want to support the preservation of marine ecosystems the world over..”

“engages students as the exhibits do in the TECH museum in San Jose”

“is interactive, hands-on”

Question #12 – What percentage of students in your class are English Language Learners (ELL or ESL)?

0-10% - 9

11-20% - 1

21-30% - 3

31-40% - 3

41-50% -

51-60% -

61-70% - 4

71-80% -

81-90% - 1

91-100% - 1

Question #13 – When you take your students on field trips do you feel as though the programs/exhibits are geared for a multi-cultural audience? If yes, why and give examples if possible? If no, why not and give examples if possible?

-If yes, why?

“All hands on...lots of experiential activities”

“Parks, docents, etc. aren’t thrown by limited English visitors. My ELL students are not mostly Spanish speakers”

“If they are hands-on & experiential it crosses all culture”

“Always addressed in opening/introduction of field trip”

“Most field trips I take my class on are not led by docents”

“2nd language support”

“If there is Spanish language translation available and I usually can translate”

“use of visuals, hands on, good scaffolding”

“Aquarium had some bilingual info”

“The Monterey Bay Aquarium’s great!”

“Missions – lots of Spanish influence. Oniell – visuals. Depends on which ones...”

-If no, why not?

“I have little need for my class but I have not noticed many attempts to provide information through multicultural approaches.”

“They don’t compare it to anything from Mexico, for example, and signs/docents/posters are not bilingual. It is very important if you want to connect with the younger students and entire families, including the parents, the entire set-up needs to be friendly and accessible to all. ”

“There isn’t usually Spanish translation or Spanish speaking docents.”

“Bilingual signs would help. Docents & employees should be multi-ethnic. Info should reflect multi-cultural interests & concerns”

“Depends, sometimes the discussion is too much for English learners”