California: Monterey Bay
Marine Communities
“Being a Docent”

(60 points) Due Monday November 17, 2008 at noon [no exceptions]. Make sure to read the first page with the instructions before you begin exploring these amazing organisms!

NOTE: ASSIGNMENTS WITHOUT ATTACHED TICKET STUBS WILL NOT BE ACCEPTED FOR CREDIT! MAKE SURE TO GET ONE (MEMBERS AS WELL) In addition, your tickets need to be marked / time-stamped before 2pm in the afternoon. You are not allowed to copy information from displays, texts, journals or web sites (unless you quote or refer to the source). All of the above are examples of plagiarism. The consequences of any plagiarism on this assignment will lead to that you receive an 'F' in the course.

Admission: Bring $22.95 and a student ID (otherwise $24.95). You may want to bring money for lunch? For $50 you can become a student member for a year (well worth it if you will visit the aquarium more than twice over the coming year). The hours of the aquarium are 10am – 6pm daily. Bring writing materials and a notebook. The lines to the aquarium are often long at the time the aquarium opens. The best time to visit is on weekday afternoons between 2-6pm.

Directions from the South Bay: Take 85 South to Hwy 101 South, In Prunedale, take Hwy. 156 West/Monterey Peninsula to Hwy 1 South. [Do not take 156 east which you will encounter before 156 west.] Take Hwy. 1 South to Monterey; exit at the Pacific Grove/Del Monte Ave. exit. Follow Del Monte Ave. (in the right 2 lanes) past Fisherman's Wharf then through the tunnel. Follow the brown directional signs to Cannery Row parking and the aquarium.

[Alternatively you can take Hw 17 to Santa Cruz and then follow Hw 1 south to Monterey.]

The aquarium's Web site http://www.mbayaq.org/ // Phone: (831) 648-4888/4800

Introduction: Monterey Bay Aquarium has made it possible for the human species to become familiar with an alien environment. Obviously the evolutionary and ecological challenges in these habitats are very different compared to the land environment. You will get an opportunity to experience the diverse marine communities existing in Monterey Bay. The purpose with the visit is to bring an understanding of the physical challenges of living in these communities. You will also become familiar with the most common species found in these communities. Hopefully the information about the marine realm presented in lecture will be enhanced by your visit.

The Task: Your visit to the aquarium will probably take anywhere between 3-4 hours. Enjoy the exhibits and take plenty of breaks as you become more familiar with these fascinating marine communities. The handout is partially designed as a guide through the aquarium at the same time as it asks you numerous questions. The answers to all the questions (with a few exceptions) can be found in the displays/tanks (typically in the text/legends/explanations linked to the specimens). Questions marked with a * do not have an answer on a display. You can go through
the questions in any order you prefer. These questions will guide you through the exhibits of the aquarium. I expect you to make an attempt to answer these questions as you wander through the dark hallways of the aquarium. The goal of the trip is to get a sense of the diverse marine communities and the life within them.

**What is Due? The Report!!!** Imagine that you are one of the docents volunteering here at the Aquarium (perhaps you will one day...: - )) . Your task is to write essays focused on three different exhibits: The Outer Bay, The Marine Communities of Monterey Bay as well as Marine Conservation issues (marked in bold (and framed) below) as you would present them to audience such as our marine biology class. In addition, you will need to write an essay focused on your own impressions of the aquarium as a learning tool. I expect these essays to be well written, factual as well as thoughtful.

It might be helpful to consider the following as you pass through the exhibits. As you pass through the different communities you should focus on the following aspects:

i) How can I describe the Exhibit?

ii) What physical conditions does life need to deal with in this community? What kinds of characteristics are adaptive in this environment?

iii) Can I name some members of this community? How are these species adapted to a life in the community? Do I know something about the life of these organisms?

iv) Is there something "cool" about these organisms that I can use to "pull" in my audience?

Your report needs to be typed (Times New Roman, point size 11, double spaced, minimal space for titles). The report should contain essays focused on the three exhibits (see below) as well as an essay (one page) encapsulating your impressions of the aquarium. [total 6 typed compact pages + title page/references):

- Outer Bay (Open Sea) [1 page]
- The Marine Communities of Monterey Bay [2 pages]
- Protecting Marine Life [2 pages]
- Essay focusing on your impressions of the aquarium as a tool for understanding marine biodiversity [1 page]

The essays (typed [otherwise not accepted]) need to be turned in on time for credit. Do not copy information from different sources! I would like you to describe the exhibits/communities based on your own knowledge and writing skills!!! DO NOT PLAGIARIZE!! You will receive an 'F' in the course if your paper contains plagiarism.
These Questions will guide you through the Aquarium... (do not turn in)

There is no need to provide full answers to these questions. None of these are due in class. However, they are helpful in terms of giving you some ideas for your written assignment. Also keep in mind that the specimens in the different exhibits fluctuate, which means that occasionally you will come across a question below that has no corresponding organism. If that is the case you should just move on. Don’t forget that the goal with the visit is to build in impression of the fantastic local marine biodiversity.

The Outer Bay (Open Sea)

In this exhibit you will get ample opportunity to study the medusa stage of the Cnidarians. Notice the tentacles, gastrovascular cavity, mouth, the slow pulsing motion, the variable size, as well as the pigmentation.

1. How is the Purple striped jelly adapted to its environment?
2. How does a Comb jelly feed?
3. How does a Gooseberry feed?
   Notice the spectacular Sea Nettles! ; - )
4. The Crystal Jellies are all transparent. What is the advantage with being transparent in this environment?
5. The medusas are considered to be part of the plankton ("drifters"). As you examine the jellies it is clear that they are moving on their own. Why do we categorize them as plankton? *
   Walk into the huge Outer Bay with the giant tank. Wow! These organisms spend most of their life cycle suspended in water without contact with the bottom or the coastline. As you examine the tank try to locate the Yellowfin Tuna, the California Barracuda, the Soupfin Shark and the Ocean Sunfish.
6. What is the role of the Yellowfin Tuna in the food chain?
7. Suggest some important adaptations for survival in this environment. *
   Spend some time here and ponder the immensity of life in this environment.
   There are some chairs on the upper level where you can take a break as the life in the Outer Bay unfolds in front of you. The MBA has done a beautiful job displaying life in the Outer Bay.
   As you leave the giant tank you will encounter some smaller displays with Pacific Sardines.
8. Why do fish school?
As you walk out of the Outer Bay exhibit there is a smaller exhibit downstairs focusing on the protection of marine life.

Protecting Marine Life
1. What kind of animals have the MBA chosen to exemplify the perils of marine life in the oceans?
2. Choose two of these organisms and explain the complex issues linked to their demise.
3. What is the effect of the growing human population on the different fish populations across the world? What kinds of technology have been developed over the last few decades to support the fishing industry? Give at least two examples of these new fishing technologies.
3. What kinds of fish are ok to eat according to MBA?

Leave this section of aquarium and walk towards the second wing of the building. This part of the aquarium contains exhibit of several marine communities present in the Monterey Bay.

The Kelp Forest
The Kelp Forest tank brought fame to the aquarium when it opened. The display of a typical offshore Kelp forest community is a wonderful sight. Watch these numerous organisms and try to identify them to the best of your ability. Do you see any interesting interactions between the organisms? Notice the abundant kelp, the current, the diversity of the organisms and the different places to live. Walk clockwise around the tank.
Towards your left you will find the Deep Reef exhibit. Begin at this exhibit and walk clockwise around this section of the aquarium to examine the following communities:

The Deep Reefs
1. Where would you expect to find a Wolf eel?
2. Compare the teeth and jaws of the Ling Cod and the Wolf Eel. Conclusions?
3. Examine the Spot Prawn's behavior and grace. At what depth are these found?
4. How do Sculpins protect themselves against predators?
5. How can a Rockfish stay in one spot in the water column without sinking or moving?
Sandy Seafloor
1. How does a Brittlestar feed?
2. Examine the Flatfish (the Sanddabs). What is unusual about their eyes compared to their body shape?
3. What happens to the eyes during early development?
4. How does a Sanddab protect itself against predators?
5. In one tank you will find numerous living Sand dollars. How many eggs does a female produce every year?
6. Why is it important for these eggs to get away from the Sand Dollar bed?
7. Examine the beautiful Sea Pen.
8. How does a Decorator Crab protect itself from its predators?
9. Notice the huge Starfish.

Shale Reefs
1. How do some clams tunnel and burrow into rocks?
2. Why do they tunnel?
3. In the open tank further down you can watch the results of the actions of these clams. The rock has a Swiss cheese like appearance. Could these empty holes be important for other organisms in the community?*
4. How does a carnivorous Chiton catch its prey?

The Wharf
1. Why are the starfish next to the wharf so large?
   These are great examples of starfish that you need to examine. Notice the individual movement of the tube feet!
2. Why is there so much life on the wharf pilings?

The Slough
1. Examine the digging clams. How do clams with hard thick shells differ from the ones with long thin shells in terms of their digging habits?
2. Where can you find a Ghost Shrimp? What do they feed on?
3. Here’s a real treat: The Fat Innkeeper. Why do you think this organism is called the "Fat Innkeeper"?
4. What is the function of the continuous pulsating movement in the worm?*

The Dunes – Bird Watching
These shorebirds have been raised by the aquarium and are extremely tame. Please don’t scare or touch the birds. It is a great opportunity to examine these species at a close range. Notice the different plumage as well as the varied shapes of the beaks.
1. What is life like in this environment? What do these birds feed on?
The Intertidal Rocky Shore
1. How do life forms differ as you move from the high to the middle to the lower intertidal zones?
2. Why is the Giant Green Anemone green?
3. How do aggregating anemones reproduce?
4. Why is space such a rare commodity in the rocky intertidal?
5. Why do hermit crabs fight?
6. How much water can one mussel filter in one hour?
7. Can you explain why parts of the rock are completely cleared from mussels?
8. What is a Limpet “farm”? Explain.
9. Give five examples of how organisms avoid danger in the intertidal zone.

Upstairs you will see some great tanks with Moon Jellies.

Moon Jellies
1. Describe the life cycle of the Moon Jellies
2. Watch the juvenile medusas. How long does it take for these to reach the adult size?
3. How does the size of the polyps compare with the mature medusas?

Anchovies
1. Why do anchovies yawn?

As you finish your observations you should make sure to spend some time pondering life as you examine the upper level of the Kelp forest tank. As you can see the subtle surface of the kelp forest gives no clues about the diversity of life below. I hope you enjoyed your intense immersion in the extremely rich and diverse marine communities found here in Monterey Bay. ; - )