Read this page and the last page before you go to the aquarium.

This exercise is optional extra credit… worth up to 15 points added to one exam score. You may do this assignment individually, or in collaboration in groups of 2 or 3. The credit you receive is the same whether you do it by yourself or with others. It is set up this way to be flexible re your preference and style of learning.

Receipts are required for each person…no credit will be given for anyone who doesn’t have a receipt, so write your name on the receipt and staple them all to this front page. Don’t lose them!!!

Receipts REQUIRED to get credit for assignment. Staple receipt(s) here

This self-guided field trip is designed to introduce you to the great diversity of marine creatures and a few of the adaptations that help them survive in the oceans. Questions may involve specimens from more than one exhibit. Some questions will require that you make observations of the organisms in the exhibits and draw conclusions. In some cases, the information you need is posted at the exhibit, but this is not always the case. There are also numerous naturalists on hand to answer questions.

This assignment should take you approximately 3-4 hours. You are expected to provide DESCRIPTIVE AND COMPLETE ANSWERS to the questions posed, so be sure to give yourself sufficient time.

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The headings in this handout correspond to specific exhibits [see map to the right] and will serve as a guide for your tour of the aquarium.

Enjoy your trip!!!
1. Life on the Edge – Wild Outer Coast & Inland Sea _3 pts_

Observe the species in the two active pools & use the booklets on display to answer the following:

1. Touch the sea anemone’s tentacles. It seems to stick to your finger. What is really going on and what function does it serve in the wild?

2. Why are green anemones green?

3. What part of the Giant Barnacle is used to capture food?

4. How do Blue Mussels hold on to the rocks?

5. Purple Sea Urchins often live where the waves are large. What protects purple sea urchins from pounding waves?

6. Provide detailed observations of any 2 significantly different species (of your choice) from the tide pools in this exhibit. For example, you could choose sand dollar & shrimp, or chiton & snake prickleback. Your observations should include how each animal moves, how it feeds and what it eats, where it occurs in the tide pool and why. Describe any other special behaviors or adaptations and the purpose of such adaptations. Drawings are encouraged as part of your description.

(1)

(2)
II. Life on the Edge -- Below the Surface

1. Name three defensive mechanisms of an octopus.
   (1)
   (2)
   (3)

2. What purposes would changing color serve the octopus?

III. Pacific Coral Reef _2 pts_

1. Reef Builders: Describe how the coral reef is built?

2. What are the major primary producers on a coral reef? ____________________________

3. Day and Night on the Reef:
   a. Define the following terms and give an example of a fish in this exhibit for each trait.
      _Diurnal:_

      _Nocturnal:_

   b. What do you think would be the advantage of being nocturnal, in a high-diversity ecosystem like the coral reef?

4. Observe the body form, swimming style, and any other notable behavior or these 4 fish:
   • gray reef shark • cardinal fish • parrot fish • clown fish
   Now choose two of these fish and compare and contrast what you observe; describe how the things you observed would help in their lifestyle & survival?
   (1)

   (2)
IV. Myth, Magic and Mystery _1 pt_

1. Note the extraordinary appendages on these creatures. What two functions do they serve?
   (1) 
   (2) 

2. Other seadragons and seahorses in this exhibit do not have these same appendages. Observe them and describe how the form suits the lifestyle of each. (you may have to speculate a little…)
   Seadragons:

   Seahorses:

Now, walk over to Building 2 for the remainder of the “tour”

V. Northwest shores (Shorebirds, Tide pool) & Salmon, _2 pt_

1. Describe the environments in these two exhibits:
   Rocky Outer Coast:

   Puget Sound Beaches:

2. Match the bird with the characteristic which best describes it.

| Tufted Puffin | a. Deep diver |
| Rhinoceros Auklet | b. Red feet, legs and mouth linings. |
| Pigeon Guillemot | c. Horn appears in adults. |
| Common Murre | d. Stiff tongues and barbs. |

Salmon Hatchery

3. According to the Monterey Bay Aquarium Seafood Watch, West Coast Seafood Guide, write down three seafood items in each of these categories:
   Best Choices: ____________, ____________, ____________
   Caution: ____________, ____________, ____________
   Avoid: ____________, ____________, ____________

4. Why do seafood choices matter?
5. Salmon conservation is an important topic in Washington state, both for commercial industry and natural conservation. Understanding its life cycle is critical to salmon conservation. On the illustration below, fill in each of the white boxes corresponding to various life stages.

![LIFE CYCLE OF CHINOOK SALMON](image)

6. Why do salmon change color?

VI. **Fishes of Puget Sound  _2 pts_**
1. Three of most important and distinct habitats in the Puget Sound are:

   __________________________________, __________________________________, ________________________.

2. Match the habitats above with best description:

   ____________ is home to fish that live on top of and even burrowed into.

   ____________ provides safe hiding places & a rich, steady food supply for fish & other anim.

   ____________ has kelp and other algae grow attached.
3. Match the Puget Sound fish with the characteristic which best describes it:

_____  Ratfish  a. Uses bioluminescence to attract mate
_____  Pinpoint gunnel  b. Changes color during courtship
_____  Buffalo sculpin  c. Uses dorsal fin to distract prey
_____  Grunt sculpin  d. Seems to disappear below 60 ft of water
_____  Sailfin sculpin  e. Mermaid’s purse
_____  Skate egg case  f. Excellent sense of smell
_____  Midshipman  g. Barbels sense food along the bottom
_____  Canary rockfish  h. Hides in empty barnacle shell
_____  Tubesnout  i. Color of food dictates fish color
_____  Sturgeon poacher  j. Hums when threatened

The Fish Dome  _2 pts_

1. Which fish in the tank exhibit “schooling” behavior? ________________
   (since there are limited numbers of fish in the tank, you could define a school as 3 or more swimming together)
   What’s the advantage of schooling?

2. Compare the form and behavior of the salmon and the halibut. Describe the niches occupied by these two large, commercially-important fish. Complete description required for full credit (i.e. full sentences).
   A niche is “a habitat supplying the factors necessary for the existence of an organism... and the ecological role of an organism in a community, especially in regard to food consumption”

   Salmon:

   Halibut:
VII. Marine Mammals _2 pts_

1. Observe the fur seal, and the sea otter, noting how each animal uses its front appendages. Now match the animals with the appropriate function for its front “legs”.

   _____ fur seal           a. grooming and feeding
   _____ sea otter          b. in swimming, as paddles

2. Otters are coastal creatures that do not inhabit the open ocean. Give two reasons why.
   (1)
   (2)

3. Why do sea otters swim on their back?

4. Compare & contrast the insulating mechanisms (i.e. keep warm) of the sea otter & fur seal.

VIII. Watershed _2 pts_

1. Name the four major sources of water that empty into Puget Sound.

   (1) __________________________
   (2) __________________________
   (3) __________________________
   (4) __________________________

2. What is the “biggest influence on watersheds since the last ice age”?

3. Seattle receives ~40 inches of rain annually. What role do trees (forest) play in terms of erosion caused by rain? Be specific. (An illustration may help answer the question)
**Tips for Aquarium assignment:**
To make most efficient use of your time at the aquarium, read through the questions ahead of time to familiarize yourself with the questions.

One of your classmates who works at the Aquarium alerted me to the fact that there have been a few slight changes to exhibits, which might make it harder for you to find some of the info you need to complete the assignment. Here are a few tips for filling in the gaps, if you don’t get all you need from the Aquarium displays or by talking to volunteers. I’ll suggest some useful websites to help.…

Close to the entry to the tide pool exhibit there is an information desk where you will find copies of a small handout titled “Seafood WATCH West Coast Seafood Guide”. Pick one up while you are in this area of the Aquarium…you will need it later.

I. There are small books sitting on the edges of the “tide pools” that provide useful info for this section.
   1. best ask a volunteer…
   5. refers you to website:  [www.wdfw.wa.gov/fish/shelfish/crabreg](http://www.wdfw.wa.gov/fish/shelfish/crabreg)

II.
2-4. At noon and 3:00 pm there are talks about octopi that usually address the things that you are asked in this section. If you miss the talks, or are unsure of the answers, it’s pretty easy to find on the web. Google “octopus defense mechanisms”, for example.

III.
4. You are asked to define NOCTURNAL & DIURNAL, and give an example of each type of fish. Here’s a tip: In general you can tell the nocturnal fish because they have LARGE EYES. It’s a pretty good bet that SMALL EYED fish are diurnal.

**Heading to Building 2**

A cautionary note. When it gets dark outside, it may be harder to see the exhibits and wall plaques in Building 2, which is lit by natural sunlight for the most part. So go early enough in the day that you can finish before dark, or do the second half of the assignment first...

V.
4. This graphic is temporarily not on display at the aquarium. You can find one similar at [www.metrokc.gov/exec/esa/downloads/41798b.pdf](http://www.metrokc.gov/exec/esa/downloads/41798b.pdf)
5. Here’s where you need the **Seafood WATCH Seafood Guide**. If you forgot to get one and get all the way home without it, you can find it at [www.seafoodwatch.org](http://www.seafoodwatch.org)

VII.
2. You can certainly describe the different FORM of salmon and halibut from observation here. That should tell you something about the habitat they occupy. To get information about their feeding behavior, you might ask a volunteer, or go to [www.piscatorialpursuits.com/wafish.htm](http://www.piscatorialpursuits.com/wafish.htm)
   This web site has more information than you need, and obviously more than you can fit into the space provided. Distill it down to a simple comparison.

*Remember to attach your RECEIPT(s) to the front of this assignment!!!*