

G115 VIRTUAL FIELD TRIP #3: MONTEREY BAY MARINE SANCTUARY

INTRODUCTION

We have been discussing marine life for the last several course modules. In this Virtual Field Trip, we will visit the Monterey Bay Marine Sanctuary of California, and review the physical characteristics and marine life found in this protected area. We will also investigate some of the environmental issues of the area, and how we might mitigate (solve) these issues. At the conclusion of the trip, you will write an essay describing the sanctuary focusing on a particular habitat and a particular environmental issue that threatens that habitat.

Read this entire worksheet carefully and completely to ensure full credit for this assignment. Instructions for submitting the Virtual Field Trip questions and Essay can be found at the end of this document.

WHERE ARE WE?

Go to maps.google.com, and search for "Monterey Bay, California".

1. **Where in California is the bay found?** _____
2. **What ocean borders the bay?** _____

The Monterey Bay is a marine sanctuary, as described on this page: <http://montereybay.noaa.gov/intro/welcome.html>. Review this website and its links, then answer these questions:

1. **What is a marine sanctuary?**
2. **What are the characteristics of the Monterey Bay Marine Sanctuary? (size, amount of shoreline, depth)**
3. **Why was the Monterey Bay Marine Sanctuary established? What is its purpose?**
4. **What are some things that a person can do in the sanctuary, if they were to visit in person?**

Marine sanctuaries provide a unique opportunity for researchers to study marine life. Review this page, and click on a few of the links to learn more about research in the sanctuary: <http://montereybay.noaa.gov/research/welcome.html>

5. **Provide a short summary of research activities in the sanctuary by describing at least three areas of research in the sanctuary. What are researchers studying here, and why?**

PHYSICAL CHARACTERISTICS OF THE AREA

Go to maps.google.com, and search for "Monterey Bay, California". Change to "Earth" view in the lower left corner of the map. Zoom out on the map so you can see the Monterey Bay (the aquarium is on the south side of the bay). The blue parts of the map show the shape of the seafloor of the bay. Look at this area, and answer this question:

6. In the middle of the bay, you should see a deep, river valley-like feature. Refer back to Chapter 3 "Marine Provinces" in your textbook. What is the name of this feature and how did it form?

Zoom back in and look at the shoreline. Pan around the area to get a sense of the characteristics of the shoreline. View the pictures associated with the map. Then, answer this question:

7. What does the coastline look like here? Is it rocky? Sandy? Flat? Steep?
8. Refer back to Chapter 10 "The Coast" of your textbook: Is this a depositional or erosional coastline? How do you know?

This page gives an overview of the physical conditions around Monterey Bay: <http://www.swellinfo.com/surf-forecast/monterey-california>. The map has a green star showing the location of Monterey Bay. Along the top of the page are weather and oceanic conditions. The map has options for waves, winds, and ocean water temperature. There is a link for tide charts just above the map, to the right. Use the data on this page to answer these questions:

9. Average wave size (make an estimate, include units on your answer): _____
10. Height and Time of High Tide (include the date of your observation): _____
11. Height and Time of Low Tide (include the date of your observation): _____
12. Wind direction and speed (make and estimate): _____
13. Current direction and speed (look for the Bouy 46042 data at the top of the page): _____
14. Water temperature (include units): _____

Review the following webcams of the Monterey Bay area:

- Port of Monterey, CA: <http://hdontap.com/index.php/video/stream/port-of-monterey>
- Monterey Bay Cam: <http://montereybaycam.com>
- Elkhorn Slough Sea Otter Cam: <http://seaotters.com/live/>
- Monterey Bay HD Cam: <http://www.offshoretheater.com/monterey-bay/>

After you have a good overview of the area, answer the question on the next page of this worksheet.

15. From the webcams, provide a short paragraph summary of the area. Include information on human structures, water conditions, shoreline features, marine life, and any other unique characteristics you observe. Consider that you are describing the area for a friend who does not have access to pictures or webcams – give them a full overview of the area.

MONTEREY BAY'S GEOLOGIC SETTING AND HAZARDS

We reviewed southern California's coastal setting in the last virtual field trip, so we have an idea of the characteristics of the shoreline here. Here, I'd like you to briefly review the geologic setting of Monterey Bay, to gain an understanding of how this area formed. Please review the following websites, <http://montereybay.noaa.gov/sitechar/geol3.html>, and <http://www.sanctuarysimon.org/monterey/sections/geology/overview.php>, and then answer these questions:

16. What plate boundary is near the bay? What type of movement occurs here?
17. What type of rocks make up the bay? (a list is fine, here)
18. What is mass wasting, and why does it occur in this location?
19. Why is earthquake activity a risk, here? What causes earthquakes here? When was the last major earthquake?
20. How did the bay form, geologically?
21. Why is coastal erosion a serious hazard here?
22. What are the features of the continental shelf here?
23. What are the characteristics of the submarine canyon of the bay?

MARINE HABITATS

The Bay hosts a variety of marine life habitats, from rocky shorelines to kelp forests to open oceans. The Monterey Bay Aquarium is a place where visitors can see the variety of marine life of the bay and learn about the habitats that make up this bay. Review these links and webcams to learn more about life in the bay:

- <https://www.montereybayaquarium.org/monterey-bay-national-marine-sanctuary> (scroll down to the middle of the page under the title "Our Exhibits Dive Deep to Explore the Bay")
- <http://montereybay.noaa.gov/visitor/dive/divehabitats.html>
- <http://www.montereybayaquarium.org/animals-and-experiences/live-web-cams/sea-otter-cam>
- <http://www.montereybayaquarium.org/animals-and-experiences/live-web-cams/kelp-forest-cam>
- <http://www.montereybayaquarium.org/animals-and-experiences/live-web-cams/open-sea-cam>

24. Using the links above, provide an overview of the characteristics of the habitat, its marine life, and the conditions that the marine life must adapt to, for each habitat by filling out this table:

Habitat / Ecosystem	Characteristics	Marine Life Found There	Conditions for Life
Rocky Shore			
Sandy Shore and Wetlands			
Kelp Forests			
Wharf Pilings and Piers			
Open Waters			
Deep Sea Canyon			

MARINE LIFE

You have already reviewed an abundance of marine life found in the bay. We haven't looked at mammals yet, so please review these links to learn more about the mammals of the bay:

- <https://www.montereybayaquarium.org/animals-and-experiences/exhibits/life-on-the-bay>
- <https://www.montereybayaquarium.org/animals-and-experiences/exhibits/sea-otters>
- <http://www.sanctuarysimon.org/monterey/sections/marineMammals/overview.php?sec=mm>

Also review this field guide of the major marine life of the bay:

- <http://montereybay.noaa.gov/reports/2006/fieldguide/2006fieldguide.pdf>

This page describes recent marine life sightings in the bay, and includes pictures:

- <http://www.montereybaywhalewatch.com/slstcurr.htm>

25. Then, using the links on this and the previous page of this worksheet, in the table below, list at least six marine mammals, fish, reptiles, amphibians, or birds found in the bay. Describe the characteristics of the animal, and its habitat. One has been done for you as an example.

Marine Life Example	Characteristics	Habitat
<i>Pelagic Cormorant</i>	<i>Diving bird, spends lots of times on rocks to dry out feathers, catches small fish by diving up to 185 feet into the water.</i>	<i>Rocky shores, open ocean.</i>

THREATS AND ENVIRONMENTAL ISSUES

Most coastal areas are threatened by human activities, as we've seen in our previous field trips and exercises. Monterey Bay Marine Sanctuary, although protected, still experiences a variety of environmental issues. Review the links on this page to learn more about these issues: <http://montereybay.noaa.gov/resourcepro/resmanissues/issues.html>

26. Then, provide a list and description of at least six issues facing the bay, by filling out the table below. List the name of the issue, its causes, its effects/impacts, and at least one solution to the issue:

ISSUE	CAUSE	EFFECT	SOLUTION(S)

This concludes your virtual field trip. Go to the next page of this worksheet for your essay guidelines and requirements.

ESSAY: DESCRIBE THE MONTEREY BAY MARINE SANCTUARY

Now that you have reviewed the oceanographic characteristics of the Monterey Bay Marine Sanctuary, you will prepare a well-researched, well-written, detailed (750-1000 words) oceanographic description of the area. Your essay should be informative and well organized. Your essay should include the following:

- A description of the sanctuary including its importance to marine life and habitats.
- Physical characteristics of the shoreline and ocean of the Monterey Bay.
- The geologic setting of the Monterey Bay Marine Sanctuary including rock types and characteristics, tectonic processes, and major geologic hazards.
- An overview of the marine habitats and marine life found in the bay.
- A specific discussion of one marine habitat with a detailed discussion of the characteristics of that habitat and the marine life that lives there. Should include information on the adaptations of life to survive in that habitat.
- A discussion of at least two environmental issues or threats to the bay including causes, effects, and what is currently being done to address the issue.
- A reflection paragraph using the writing prompts below.

Follow the tips and guidelines below when preparing your essay:

- A minimum of **750 words** and a maximum of **1000 words**. This is 2-3 pages of double-spaced text. Use the word count tool in your word processor to be sure you have the correct amount of text.
- **Your essay must include** a title, at least 3 subheadings, at least 3 images, and a section titled "Works Cited". Subheadings are titles to paragraph(s) that demonstrate the major ideas of that paragraph.
- **Your description should be oceanographic and scientific in nature.** Use terminology from the virtual field trip worksheet and from your textbook readings. Your descriptions should give a thorough overview of the location and all of your content must be scientific and geologic in nature.
- **Your description should include at least 3 graphics;** one should be a map and all should be captioned and referenced. A caption tells your reader what the graphic shows. The reference tells where you found the graphic.
- **At least 3 resources must be cited in MLA or APA format,** both in-text and in a Works Cited section. Your essay should integrate at least three primary resources – you may use some of the resources you explored in the previous pages of this virtual field trip, or you may find your own resources to support your discussion.
- **A reflection paragraph at the end of your essay, of no less than 250 words, should address the following questions:**
 - *What did you learn from this virtual field trip that you did not know before?*
 - *What did you find most interesting about this virtual field trip?*
 - *Give a specific example of a time where you were able to directly apply your oceanographic knowledge during this virtual field trip.*
 - *What other questions did this virtual field trip create in your mind? In other words, what more do you want to know about the Monterey Bay Marine Sanctuary?*

Your essay should clearly flow from introduction to conclusion and should give your reader a comprehensive overview of the oceanographic characteristics of the Monterey Bay Marine Sanctuary. For more resources on the writing and research process, please see page 8 of the course syllabus. If you have any questions, or need more resources for writing, please contact your instructor or the University Writing Center (see syllabus, page 10).

SUBMITTING YOUR COMPLETED VIRTUAL FIELD TRIP AND ESSAY

Your grade for this assignment is based on your answers to the virtual field trip questions (page 1-4 of this document) and the quality and completeness of your essay (page 5 of this document). Therefore, you need to submit both your answers to the virtual field trip questions AND your essay to earn full credit for this assignment. Both portions will be submitted to the "(FT3) Virtual Field Trip #3: Monterey Bay Marine Sanctuary" assignment of Canvas Assignments.

You should plan to upload both at the same time; you will NOT have the option to submit one first, and the other later – both parts must be submitted at the SAME time.

VIRTUAL FIELD TRIP QUESTION SUBMISSION (PAGES 1-6)

You have several options for submitting your completed field trip questions on page 1-6 of this document, please choose ONE of these option to submit your worksheet answers by the due date.

1. **Scan and Upload** your completed worksheet (in your own handwriting) to Canvas Assignments.
2. **Upload a Word document** of your completed answers (typed) to Canvas Assignments.

Whichever option you chose should be submitted to the "(FT3) Virtual Field Trip #3: Monterey Bay Marine Sanctuary" assignment of Canvas Assignments. You should plan to upload your answers at the same time as your essay (see below). You will NOT have the option to submit one first, and the other later – both parts must be submitted at the SAME time.

A rubric is posted to Canvas Assignments for grading, and will be used to evaluate your work. In general, your instructor will be looking to see that you answered each question completely, and that your answers demonstrate a clear understanding of the web resources provided, and of your understanding of the module readings assigned.

ESSAY SUBMISSION (DESCRIBED ON PAGE 7)

Your essay should be submitted as a Word or PDF document only, submitted to the "(FT3) Virtual Field Trip #3: Monterey Bay Marine Sanctuary" assignment of Canvas Assignments. You should plan to upload your essay at the same time as your answers to the questions on page 1-6 of this document (see above). You will NOT have the option to submit one first, and the other later – both parts must be submitted at the SAME time.

Your essay will be graded on how well you cover the required content of the essay in an organized, cohesive, grammatically correct, well-referenced essay. A rubric will be posted to Canvas Assignment to show how your grade for the essay will be calculated; plan to review that rubric before you submit your essay.

GRADING

Your virtual field trip answers and essay will be graded within 1-2 weeks of the due date. The [rubric posted to Canvas Assignments](#) for this assignment will be used to assess your work. Your instructor may include additional feedback with the rubric. You should plan to review your rubric and feedback after it is posted, and apply that feedback to your next virtual field trip. Generally, your grade will be calculated as:

- **25 points for the accurateness and quality of your answers to the Virtual Field Trip Questions 1-26.**
- **50 points for the quality, accuracy, resources, and reflection of your Virtual Field Trip Essay.**

If you plagiarize this assignment, you will receive zero (0) points with the possibility of failing the class. Please review pages 6 and 8 of the course syllabus for more information on academic honesty and plagiarism.