

EXERCISE 16—Self-Guiding Field Trip

Go to the Zoo, the Oakland Museum, or Steinhart Aquarium and complete the appropriate assignment.

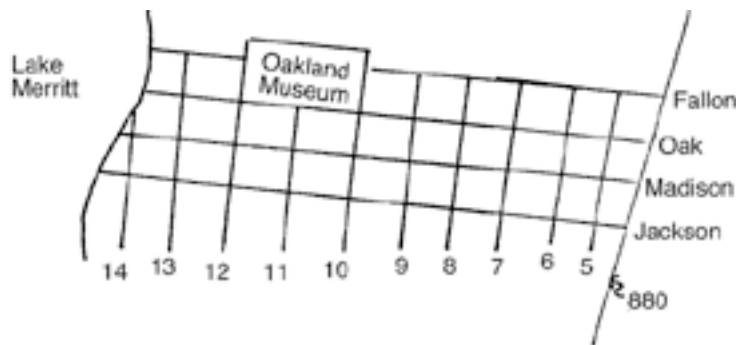
Date due: _____ 50 points possible

How to get there from Skyline College:

San Francisco Zoo. Skyline Blvd. north. Sloat Blvd. west to Zoo.

Steinhart Aquarium. Skyline Blvd. north. Sunset Blvd. to Golden Gate Park.

Oakland Museum. 101 to Bay Bridge.
 Bay Bridge east to Nimitz (880).
 880 south to Jackson St.
 or BART to Lake Merritt Station



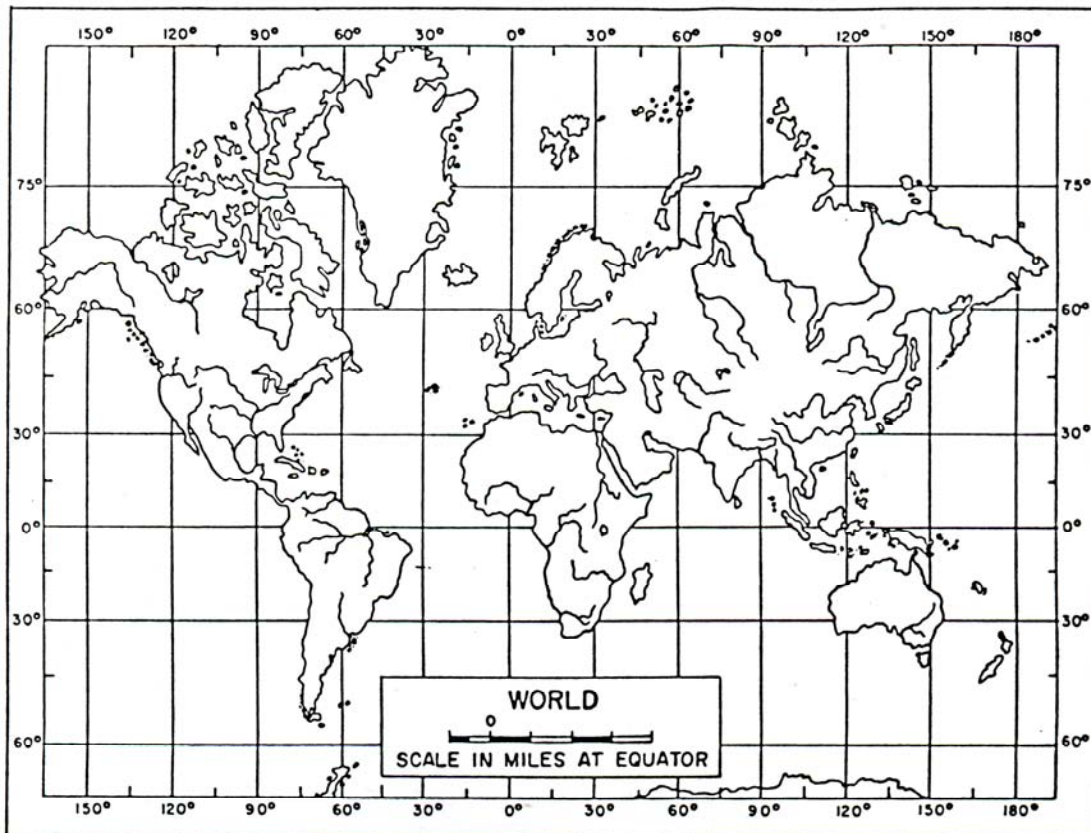
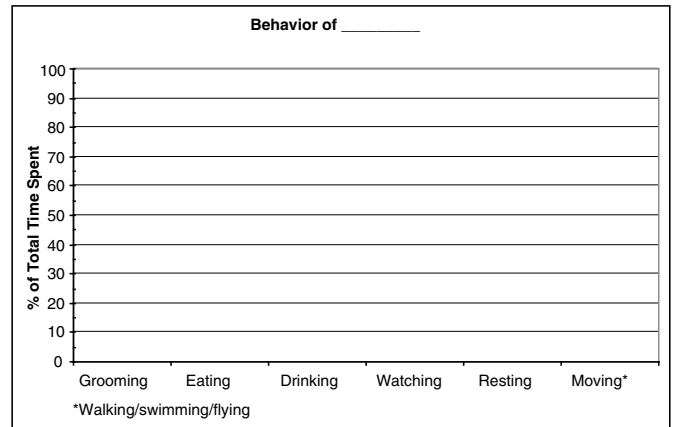
References

1. You **must** cite at least 3 references with current publication dates (no older than 1985).
2. At least two references **must** be articles from scientific or technical journals (*Scientific American*, *Science News*, *National Geographic*, and *Discover* are acceptable).
3. Be sure to evaluate whether your internet references are from academic sources.
4. All citations **must** be in the proper format. See the Style Sheet on the BIOL 101 web site.



ZOO (Use this page for a Mammal, Bird, or Invertebrate):

1. **Go** to the San Francisco or Oakland (Knowland Park) Zoo.
2. Write a report in **your own words** addressing the following items. You must write your own, individual paper and the paper must be **typed**.
3. **Attach** this page to your report. Note point value for each item; the (#).
4. **Write a record** of your observations during your tour. Not all of the animals will be active. At least list the animals that you see and any information that seems important to you. (10 points)
5. **Write a 1-2 page report** about an animal that you observed. This report should include the following (note the point value of each item in parenthesis):
 - a) The scientific name, the family, and the common name (3)
 - b) Identify the animal's range on the accompanying map. (2)
 - c) Animal's niche (2)
 - d) Climate in the animal's range, vegetation present (4)
 - e) Special adaptations for survival (5)
 - f) Is this animal endangered? Why/why not? (3)
 - g) What did you find interesting about the animal? (3)
 - h) Include a picture, photograph, or drawing of the animal. (2)
 - i) Record the behavior of your animal for one hour. Draw a graph showing time spent in the various activities. (10)
 - j) References you used; citations must be in the correct format. (6)



Oakland Museum:

1. **Go** to the Oakland Museum, California Natural History Section.
2. Write a report in **your own words** addressing the following items. You must write your own, individual paper and the paper must be **typed**.
3. **Attach** this page to your report. Note point value for each item; the (#).
4. **Write** a description of each of the following areas: Coastline communities; Coastal mountain communities; Inner Coastal communities; Interior valley communities; Sierra-slope-foothill communities; High Sierran communities; Desert communities. (10 points)
5. **Write a 1-2 page report** about a community that you studied. This report should include the following (note the point value of each item in parenthesis):
 - a) Diagram a food web (name species of producers, consumers, and scavengers found in this community) (6)
 - b) Predator-prey relationships. Give specific examples. (5)
 - c) Prey defenses. Give specific examples. (4)
 - d) Predator types. Give specific examples. (4)
 - e) Climate, vegetation present (3)
 - f) Special habitats and niches unique to this community (5)
 - g) What did you find interesting about the community? (3)
 - h) Include a picture, photograph, or drawing, of some identifying feature of this community. Or a labeled pressed plant from this community. (2)
 - i) Mark the location(s) of this community on the accompanying map. (2)
 - j) References you used; citations should be in the correct format. (6)



Aquarium (Use this page for a Fish):

1. **Go** to the Steinhart Aquarium.
2. Write a report in **your own words** addressing the items listed below. You must write your own, individual paper and the paper must be **typed**.
3. **Attach** this page to your report. Note point value (#) for each item.
4. **Write a record** of your observations during your tour. At least list the animals that you see and any information that seems important to you. (10 points)
5. **Write a 1-2 page report** about a fish that you observed. This report must include:
 - a) The scientific name, the family, and the common name (3)
 - b) Identify the fish's range on the accompanying map. (2)
 - c) Animal's niche. Describe your fish's feeding. Is it an attacker, ambusher, picker, prober, sucker, grazer, or grubber? (3)
 - d) Does your fish have a lateral line? What is the function of the lateral line? (3)
 - e) Note anatomical differences between your fish and the "typical" fish on the accompanying drawing. Describe in your paper how these adaptations are useful to your fish. (4)
 - f) Describe the adaptive advantage of your fish's coloration. Is it an advertiser, cryptic, or does it change color? (3)
 - g) Part of the secret of speed of fish such as marlin and mako sharks is in the **high aspect ratio** of the caudal (tail) fin. A fast fin is designed to minimize disturbance of the water and therefore minimize resistance. ①Calculate the aspect ratio of the caudal fin of your fish. ②How would you modify the caudal fin to make your fish faster? (4)

	Your fish	Caudal fin height (h), cm	Caudal fin length (L), cm	Caudal fin width (w), cm	Aspect ratio = $\frac{h^2}{L \times w}$
①	Your fish				
②	Your fish modified				

- h) The **swimming speed (V, cm/sec)** can be equated to the length (L, in cm) and frequency of the tail movement (f, in beats/sec) by the following formula:

$$V = \frac{1}{4} [L(3f-4)]$$

Add your fish to the data table below and calculate V for each fish. (3)

Species	f	L	V
Goby (<i>Gobinus minutus</i>)	12	5	
Wahoo (<i>Acanthocybium solandri</i>)	12	183	
Your fish			

- i) Approximately how many times its own length does a goby travel per second? _____ A wahoo? _____ If these ratios were constant, a 6 meter great white shark would travel in excess of 120 mph! However, the shark's large mass creates drag. This introduces the aspect of **fineness ratio**. The fineness ratio is the ratio of the length of the body (L) to the average of the maximum height and breadth. In designing airplanes, the optimum fineness ratio is 2.5. ①Determine the fineness ratio of your fish. ②Consider your calculations in g, h, and i—what anatomical changes would make your fish faster? (4)

	Your fish	Length of body (L) in cm	Maximum height (H) in cm	Maximum breadth (b) in cm	Fineness = $\frac{L}{(H + b)}$
①	Your fish				
②	Your fish modified				

- j) What did you find interesting about the animal? (3)
- k) Include a picture, photograph, or drawing of the animal. (2)
- l) References you used; citations must be in the correct format. (6)

