

Name _____ Instructor _____ Lab Section _____

<p>Objectives:</p> <ul style="list-style-type: none"> • To observe and appreciate the displays and public information at the Museum of Natural History • To observe the diverse and interesting adaptations that animals have evolved in order to survive and reproduce in their environment. 	<p>Background material may be found in:</p> <ul style="list-style-type: none"> • Chapter: 15.6 • Chapter: 18 (all sections) • Chapter: 19.1-19.8 <p><i>Biology: Concepts & Connections, 8th ed</i></p>
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The purpose of this exercise is to introduce you to the beauty and diversity of life in the present and past and to focus your attention on the adaptations that each organism has evolved in order to survive and reproduce in nature. Our emphasis will be on animal diversity and adaptations.

Meet your instructor at the Blue Whale Skeleton in front of the museum (next to the parking lot). You will begin your lab here, answering the questions below regarding this exhibit. Once inside the museum, you will make observations and answer questions from many of the museum’s “Halls”. A map of the museum can be found on page 12.8. With a little knowledge of the general biology of each specimen, you should be able to relate how its color, form, shape, behavior, etc. is adapted to its natural environment.

BLUE WHALE SKELETON (outside in front of the museum)

 **QUESTIONS**

What is the genus and species name of the blue whale? _____

Whales are endothermic (erroneously often referred to as “warm-blooded”), air-breathing mammals, as are humans. In what way does this skeleton resemble a human skeleton?

What structures are missing from this skeleton that you would expect to find in a human skeleton?

Are these differences between whale and human skeletons related primarily to differences in locomotion, or to some other differences in ways of life? Explain.

Whales are the largest animals ever to have lived on earth, and the Blue Whale is the largest whale species. Although this particular whale was not one of the largest of blue whales, it was still huge.

How long was this whale? _____ Blue whales can reach lengths of up to 105 ft, and weigh as much as 200 tons (400,000 lbs). Based on this, how much do you think this whale weighed when it was alive? _____

Do you think that a creature of this weight could ever have lived out of water? _____

In reference to the question above, **Why, or why not?**

HALL OF FOSSILS AND PALEONTOLOGY

This hall presents the diversity of life in past ages as shown by the fossils left behind. Most of the fossils in this room were found locally, as you will see if you read the cards under each one, yet many of these fossils represent forms very different from those seen here today. This suggests that the environment has changed greatly over time, even in this limited area.

The various exhibits in this hall should prepare you to answer the following questions. Start at the exhibit "Scale of Geologic Time".

 **QUESTIONS**

What is a **fossil**? _____

How long has there been life on earth? _____

If the entire geological timetable were condensed into a single year, how long would humans have existed on Earth?

There is evidence that mammoths once lived in Santa Barbara or Goleta area. What is that evidence? _____

List the two species of mammoth that once lived in this area:

1. _____ 2. _____

According to the dating of the fossil, how long ago did mammoths live here? _____

Where did the smallest species of these mammoths live? _____

Move toward the other end of the Hall. What and when was the "Golden Age of Mammals"? _____

What feature does the giant fossil bird at the end of the hall have that is not seen in modern birds? _____

What does this suggest about the evolutionary relationship between birds and reptiles (such as dinosaurs)?

MARINE HALL

As you move into the Marine Hall from the Hall of Fossils, you will see a room with displays of the many different marine invertebrate phyla. Invertebrates are animals that do not have a backbone. Phylum is the classification level just below that of Kingdom. All of these specimens are in the kingdom Animalia. Phyla displayed include Cnidaria, Porifera, Annelida plus three other "worm" phyla, Arthropoda, Mollusca, and Echinodermata. In each exhibit, try to observe how the adaptations of the organisms shown help them to survive in their particular habitats, and notice how many different habitats there are in and around the sea.

Browse the exhibits of marine invertebrate phyla. Pick two different phyla to study more closely. For each, provide the phylum name, **three distinguishing characteristics** of organisms in that phylum, and **two examples of specific animals** in that phylum.

1. Phylum Name: _____

Characteristics: _____

Specific organisms: _____

2. Phylum Name: _____

Characteristics: _____

Specific organisms: _____

What is the largest **invertebrate** displayed in this Hall (hint: look up!)? _____

What is its length? _____ What are its closest relatives? _____

Vertebrates are animals with backbones. Fish are the most abundant vertebrates in the marine environment (other marine vertebrates include mammals, such as dolphins and seals).

Look at the display of **Chondrichthyes** and **Osteichthyes**; what are two major differences between these two groups of fish?

1. _____

2. _____

What are two similarities?

1. _____

2. _____

Based on the numbers of different phyla and species presented in this Hall, do you think vertebrates or invertebrates are more numerous in the ocean environment? _____

As you move further into the Marine Hall, peruse the exhibits of the Sandy Beach, Tide Pool, and Kelp Forest habitats.

Most species living in the ocean move about by crawling, walking, or swimming. However, many marine species are sessile (sedentary) organisms. **Sessile organisms are permanently attached to a substrate** (such as rock), and do not move about. Give three examples of sessile marine organisms.

1. _____
2. _____
3. _____

What do these permanently attached organisms eat? _____

Does the diversity of marine habitats help to explain the diversity of organisms found in the sea? _____

CARTWRIGHT HALL: PLANTS, INSECTS & INTERACTIONS

Insects are a tremendously diverse group of organisms, occupying many different habitats and displaying many different lifestyles. In fact, based on the number of different species and the total number of individuals, a visitor from another planet might well conclude that insects are the dominant life-form on earth. Through their interactions with plants, they affect the lives of most other creatures on our planet. Look at the exhibits on the following topics, and answer the questions below:

QUESTIONS

Pollination: What four groups of insects act as pollinators?

1. _____
2. _____
3. _____
4. _____

Insect Migration: What local insect is a champion at long-distance migration? _____

Why do they migrate? _____

To where do they migrate? _____

Habitats:

How many local habitats can you list? For each habitat, list one species that is common in that habitat.

Habitat	one common species for that habitat

Which are the two most extensive habitats in Santa Barbara County?

1. _____
2. _____

MAMMAL HALL

This hall depicts some of the many mammal species that live, or once lived, in the Santa Barbara region. All are endothermic, air-breathers, have fur or hair at some stage of their lives, and nourish their young on milk from the mother's mammary glands. The most primitive, yet still successful, of these species is the opossum, which is found near the entrance to the hall. Other more specialized species are found throughout the hall. Some are carnivores, some are herbivores, some swim, and some fly, making mammals a very diverse group indeed.

QUESTIONS

List four characteristics of mammals. Put a star next to the two characteristics that distinguish mammals from other vertebrates (that is, which ones are unique to mammals?)

- 1. _____
2. _____
3. _____
4. _____

There are 38 species of mammals shown in this hall, almost all of which live or at one time lived in the Santa Barbara area. Which species have been extirpated from Santa Barbara County (that is, which are no longer found here)?

Why do you suppose these species can no longer be found here?

Compare the Harbor Seal (Phoca vitulina) with the California Sea Lion (Zalophus californicus) across the hall. What differences do you see (look at the ears and the hind legs)?

Which is the "trained seal" of circuses, and why, on the basis of these differences?

Which mammal can fly? _____

How does this mammal find its prey?

DENNIS M. POWER BIRD HALL

The specimens in the Bird Hall are arranged ecologically by habitat preferences and foraging strategies. This makes it more intuitive to see the similarities between disparate species of birds

 **QUESTIONS**

Birds have many different kinds of feeding strategies. List all the feeding strategies you can find in the bird hall.

_____	_____
_____	_____
_____	_____
_____	_____

Draw the heads and bills of a nectivore, insectivore, carnivore and granivore. Be sure to label which is which and give the name of the bird you sketched below.

How does the shape of the bill relate to a bird's feeding strategy?

 QUESTIONS CONTINUED

Why do vultures and condors, which eat carrion (dead, rotting carcasses), have naked heads, whereas hawks and eagles have fully-feathered heads?

What features are shared by the hawks and owls?

How does this relate to their method of capturing prey? Assuming that they capture similar prey, do they compete directly in nature or does some difference in their behavior isolate them from direct competition? What is that difference?

Sketch the foot of a surface diver, a hawk and a warbler.

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Surface diver

hawk

warbler

Give three reasons for the differences in the feet you sketched above.

1. _____
2. _____
3. _____

The back part of the bird hall has dioramas with backgrounds painted by noted local artist Ray Strong. Do you recognize any of the locations depicted? Each habitat shows a few of the bird species normally found there. Enjoy the beauty of each scene, and the adaptations of the birds within. Note how the form of each bird (color, wing shape, leg length, bill form) adapts it to its specific habitat.

Watch the two minute video on birds to test your ideas on bill and feet usage,

 **QUESTIONS**

California Condors are the largest birds in North America.

Look at the “San Raphael Wilderness” exhibit for information on the condors. See “Conservation Issues” at the bottom of the sign. What has driven the California Condor to the brink of extinction?

What efforts are currently being made to aid in Condor recovery?

Map of the "Halls" of the museum:

SELF-GUIDED TOUR



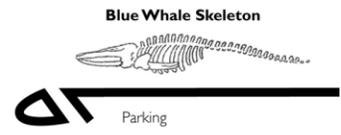
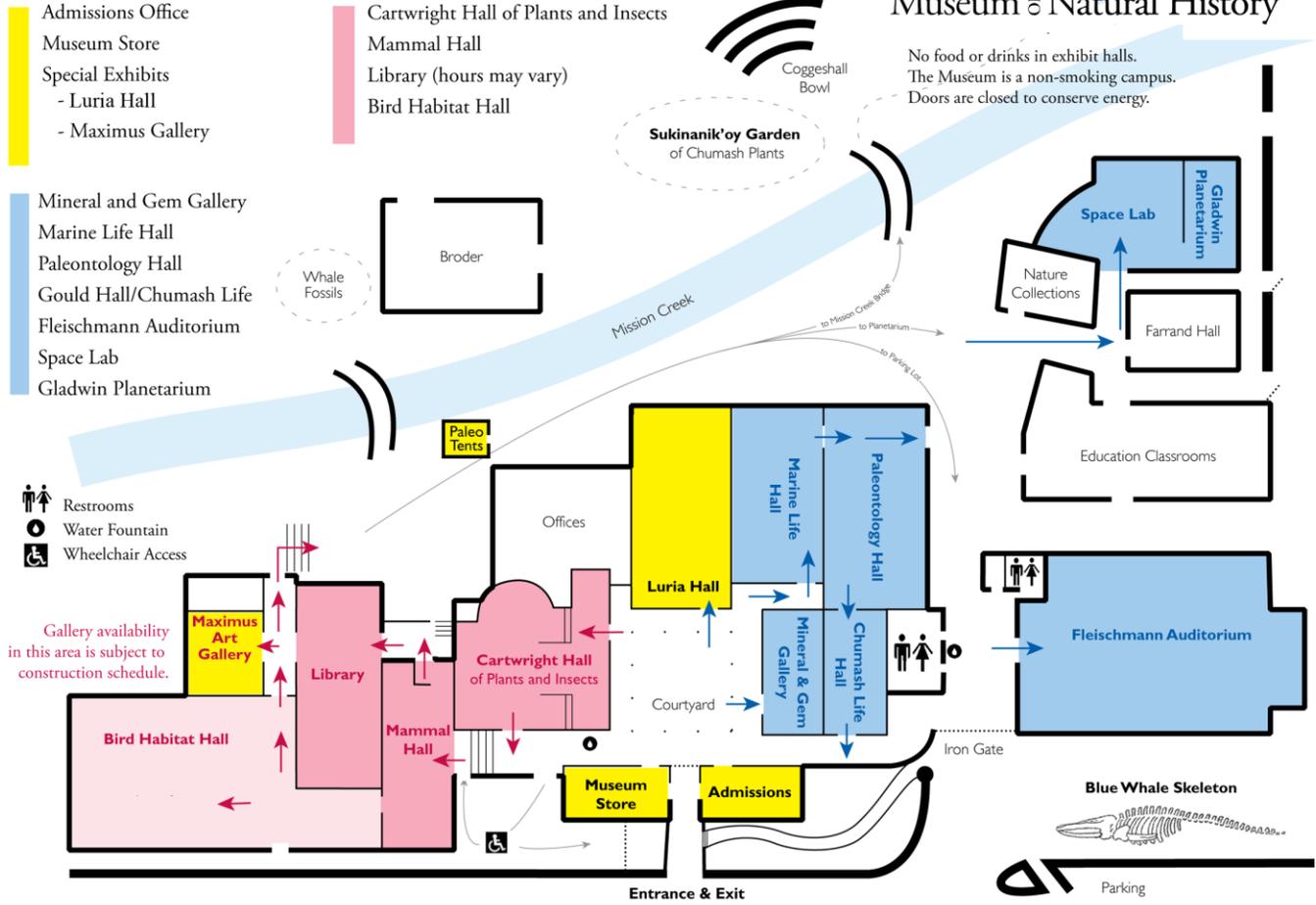
Santa Barbara
Museum of Natural History

- Admissions Office
- Museum Store
- Special Exhibits
 - Luria Hall
 - Maximus Gallery

- Cartwright Hall of Plants and Insects
- Mammal Hall
- Library (hours may vary)
- Bird Habitat Hall

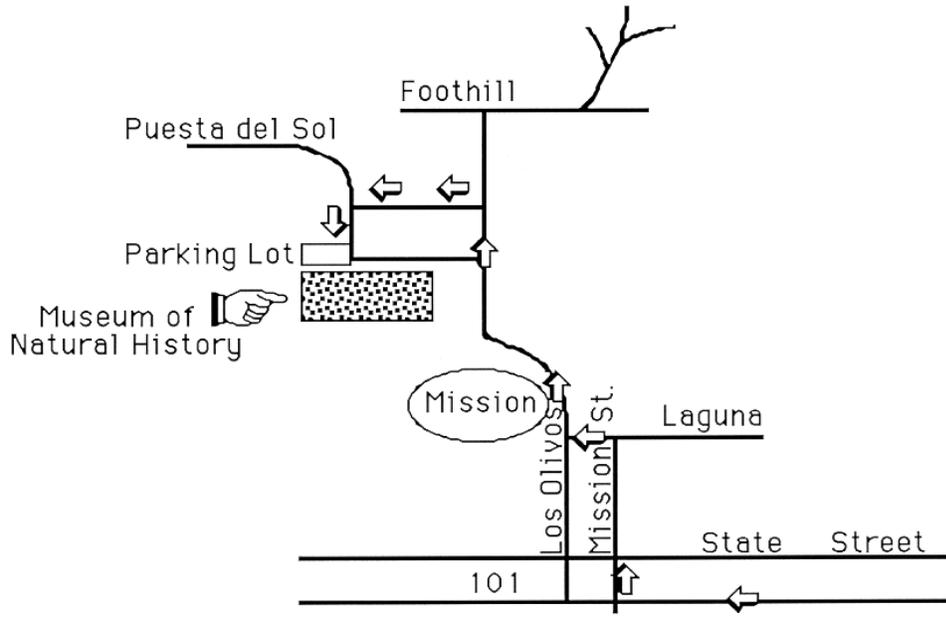
- Mineral and Gem Gallery
- Marine Life Hall
- Paleontology Hall
- Gould Hall/Chumash Life
- Fleischmann Auditorium
- Space Lab
- Gladwin Planetarium

No food or drinks in exhibit halls.
The Museum is a non-smoking campus.
Doors are closed to conserve energy.



Directions and Map to Santa Barbara Museum of Natural History:

Take 101 North (up the coast) from SBCC. Turn off on Mission Street and go (right) toward the mountains. Turn left where Mission dead ends on Laguna and then right onto Los Olivos. Go by the Santa Barbara Mission. Follow the signs to the Museum. If you get to Foothill you have gone too far. There is plenty of free parking. Start right outside the Museum at the blue whale skeleton in front.



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