

Name: _____ Class: _____ Grade: _____

Fieldtrip #4 - Coastal Estuary Field Trip Worksheet

OBJECTIVES

- describe the geological processes responsible for forming marine terraces
- describe the geologic processes responsible for forming coastal estuaries
- summarize the major ecological attributes of coastal estuaries
- identify common wetland plant and bird species and their adaptations

GEOLOGY

1. What happens to world sea level during...
...glacial periods when large ice caps grow at the poles? _____
...interglacial periods when the polar ice caps melt? _____
2. Compared to today, how much lower was world sea level 20,000 years ago during the Last Glacial Maximum? _____ feet
3. How many major glacial-interglacial cycles have occurred during the last 500,000 years? _____
4. About how much world sea level rise and fall (in vertical feet) occurred during the biggest of these glacial- interglacial cycles? _____ feet
5. You have seen how eustatic world sea level has gone up and down during the last 500,000 years. What about vertical tectonic movement of the land in Southern California? Has the land been mostly rising upward, subsiding (sinking downward), or staying in place? Why has it done this?
6. Sum up in a paragraph how the up-and-down cycles of the sea, along with erosion and sediment deposition by rivers, have created our coastal wetlands
7. The photographs on the next page match views from a hilltop on the north side of the lagoon. It shows four **marine terraces**, with the elevation of each terrace listed. Each terrace marks a place where ocean waves were once breaking! Use the elevations along with the figure in your guidebook to identify each terrace's probable name and age, writing the information in the blanks on the photos.
8. From question 7 above, what's the connection between terrace age and terrace elevation?

9. Sum up in a clear paragraph how the up-and-down cycles of the sea, along with the slow tectonic rising land, have carved San Diego's marine terraces. Include in your explanation why older terraces are found at higher elevations, as shown by your answers on the photograph.



Terrace elevations from Google Earth

ECOLOGY

1. Southern California's coastal wetlands are commonly called lagoons, but technically, they are estuaries.
What is an estuary?
2. Why do coastal wetlands have high primary productivity? List three reasons:
a: _____
b: _____
c: _____
3. What year was the railroad causeway constructed? _____
What year was Pacific Coast Highway constructed? _____
What year was Interstate-5 constructed? _____
What affect do these features have on water circulation and primary productivity in the wetlands?
4. How are coastal wetlands important for fish, especially certain open-ocean fish species, including some that humans harvest for food?
5. Your answer to #4 is one example of how coastal wetlands benefit humans. What are some others?
List as many examples you can think of showing how humans benefit from wetlands.
6. The plants that dominate coastal wetlands are halophytes. What is a halophyte?
7. Identify cordgrass. Where does this halophyte grow in the lagoon? How does it deal with excess salt?
8. Identify pickleweed. Where does this halophyte grow in the lagoon? How does it deal with excess salt?
9. Identify saltgrass. Where does this halophyte grow in the lagoon? How does it deal with excess salt?
10. Bird species in the wetlands are either resident or migratory.
Which type (resident or migratory) has the greater number of species? _____
What is the Pacific Flyway?

11. Check the box to identify each bird as either resident, migratory: winter visitor, or migratory: spring/summer visitor.

Species	Resident	Migratory: Winter	Migratory: spring/summer
<i>Great Egret</i>			
<i>Northern Harrier</i>			
<i>Whimbrel</i>			
<i>Great Blue Heron</i>			
<i>Plover</i>			
<i>Willet</i>			
<i>Yellow-Breasted</i>			
<i>Snowy Egret</i>			
<i>Marbled Godwit</i>			
<i>Oriole</i>			
<i>Osprey</i>			
<i>Pie-billed Grebe</i>			
<i>Western Sandpiper</i>			
<i>Least Sandpiper</i>			
<i>Pintail Duck</i>			
<i>Mallard Duck</i>			
<i>Northern Shoveler</i>			
<i>Wigeon Duck</i>			
<i>Ridgeway's Rail</i>			
<i>Cormorant</i>			
<i>Black-Headed</i>			

12. In the table, circle the names of all the birds that we have spotted today. Did we see any species not in the table? If so, list them below.

Written Fieldtrip Reflection

Directions: Write a brief personal reflection of what you enjoyed and learned about doing this fieldtrip. A complete reflection should use up all the space provided below.

13) What did you actually discover and learn during this field trip?

14) What did you find most interesting and/or important?

15) What did you find most difficult or challenging?
