

21 points -> points for total cumulative: $21/4 = 5.25$

1) WATCH THE VIRTUAL BEACHWALK VIDEO ON THE CLASS WEBSITE!

Do the assignment while you watch the video.

2) Add your full name (your family/last name first) to the top on each page.

3) Provide only answers (not the questions!) in the document you submit.

4) Label each of your answers (1a, 1b, 1c etc.), starting a new line for each of your answers.

5) Provide short answers. Shorter is better! No full sentences required. Definitely no long answers. Points may be subtracted for answers that are too long/answers given that are not relevant to the question (including cut-and-paste jobs of entire sections from the class website).

6) include appropriate units where needed (not just numbers)

7) Hand-written ok as long as the handwriting is easily readable.

8) Submit a single pdf to Gradescope. Only submit a high-quality pdf. Cell phone photo scans are not ok! Instead, use a professional app, such as Turboscan.

9) Important!!!!!! After you uploaded your pdf but before hitting the submit button, please identify on which page each of your answers to problems 1 - 10 are. Only when this is completed, hit the submit button.

In tasks, 1 and 3, you will contrast the scenery south and north of the pier, following closely the narrative of the virtual beachwalk. You will sketch both sceneries (**not maps!!**). Both B/W or color is fine, and you may use a computer program to do the sketches or use hand drawings that are then properly scanned and included in your document that the right place where they belong. Make sure that all items that give points are included in your drawing! Make sure you also added proper labels in your drawings!

Submission and question number association at Gradescope is the same as with regular homeworks (see point 9 above).

SOUTH OF THE PIER

1. a) Sketch what you see south of the pier and add labels: SIO pier, beach, SIO, La Jolla Shores, La Jolla Beach and Tennis Club, Mt. Soledad, La Jolla cove, Children's Pool. (2 pts)
 - b) Add a label for San Clemente Canyon to your sketch #1. (0.5 pt)
 - c) Sketch roughly where the Rose Canyon Fault goes along the San Clemente Canyon and goes off-shore near the LJ Beach and Tennis Club. (0.5 pt)
- (3 points)

2. a) Why did Mt. Soledad form? (explain the situation with the fault and reason for uplift) (0.5 pt)
 - b) To which fault to the north could the Rose Canyon fault potentially connect? (0.5 pt)
 - c) Why does this increase the seismic risk for our local shore? Think earthquake size. (0.5 pt)
 - d) Name three seismic hazards that San Diego faces in case of local earthquakes, including off-shore earthquakes. (0.5 pt)
 - e) Provide an example of a local fault off-shore San Diego. (0.5 pt)
- (2.5 points)

NORTH OF THE PIER

3. a) Sketch what you see north of the pier and add labels: SIO pier, Birch Aquarium, Hubbs Hall (SIO Biology), IGPP (SIO Geophysics), "busy cliffs" with lots of slumps, faults, undercuts (including one below IGPP), beach. (2 pts)
 - b) add former Southwest Fisheries Building (with a slump in front), Torrey Pines Golf Course (0.5 pts)
 - c) Add the 1949 Torrey Pines slide, just at the foot of the cliffs below Torrey Pines Golf Course. (0.5 pt)
- (3 points)

4. Age and making of the cliffs.

- a) About how old are the cliffs? (0.5 pt)
 - b) In which kind of environment were the cliff sediments originally deposited? Be as specific as possible. (0.5 pt)
 - c) Why did the cliffs develop internal faults? (0.5 pt)
 - d) Explain the two reasons, plate tectonics and climate, why the cliffs are now above sea level. (0.5 pt)
- (2 points)

5. The two dominant rock formations at the SIO beach.

- a) Which two San Diego rock formations do we see at the SIO beach? (0.5 pt)
 - b) How do both rocks behave in terms of porosity/letting water migrate through the rock? (0.5 pt)
 - c) What happens when the water pools on top of the Ardath shale (think weathering in the sandstone above, the special mineral that forms, and consequences for mass movements). (1 pt)
- (2 points)

6.

- a) Provide at least six natural factors that weaken the local cliffs. (1 pts)
 - b) Provide three human factors that inject water into the local cliffs and weaken them. (0.75 pt)
 - c) Provide at least six measures how we could at least temporarily help reduce cliff collapse. (1 pt)
 - d) Provide two reasons why it is useful to plant Torrey Pines on the cliff tops. Make sure your answers and reasoning are complete in both cases. (0.75 pt)
- (3.5 points)

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LOCAL BEACH SAND

7. Local beach sand throughout the seasons.

- a) Why do we lose the beach sand in winter? Be as detailed as possible (weather, waves, be specific about cause and effect). (0.5 pt)
 - b) Where does this sand go? (0.5 pt)
 - c) About how much sand do we lose? (0.5 pt)
 - d) Describe how we get our sand back in spring (rivers north, California and longshore currents) (0.5 pt)
 - e) How do some other community beaches get their sand back? (0.5 pt)
- (2.5 points)

LIQUEFACTION

8. Finally, on the beach, let's experience liquefaction

- a) Describe walking in completely dry sand (is it easy?) (0.5 pt)
 - b) What happens when small amounts of water are added? What does the water do? How does it affect our walking? (0.5 pt)
 - c) When we step slowly on water saturated sand, describe where the water goes. (0.5 pt)
 - d) Moving on from c) what makes the sand liquefy? Be as specific as possible (i.e. presence of water, liquefaction are wrong answers). (0.5 pt)
 - e) What can we do to nevertheless build structures in such an environment? (0.5 pt)
- (2.5 points)