

Study Guide for Oceanography 10 Midterm

Disclaimer: This study supplement is designed to help you keep track of some of the major concepts in Ocean 10, however it does not cover all the material in all 14 lectures. The information here may or may not be on the midterm. The purpose of this is to give you a little direction on what to focus on. The midterm may cover material not listed here.

Most important: focus on the lecture notes, and labs. All of the questions on the midterm will be on material covered in the lectures, or the labs. Use the text book to supplement the lectures and labs. Information in the text book that we never talked about will not be on the midterm.

Important Numbers: there were a lot of important numbers given in the first half of Ocean 10. Practice them and organize them so they are not confusing. You will need to use the conversion factors given in lab #1. **Be prepared to convert Km to miles and fathoms etc.** Know the four numbers given for geologic time, including the age of the ocean floor.

Other important numbers: 1.5km/s. For water depths / Sea Floor Topography: 128 meters, 1 : 500, 3.7km, >6km, 0-300m, 300m – 3km, 3km – 4.5km, <1 : 1,000

ALSO: 4 degrees Celsius, 35 parts per thousand or 965g fresh & 35g salt, distribution of all water = >97% seawater, ~2% Ice and then groundwater, lakes, rivers etc, 30% or more to be an ooze

History of Oceanography: know who did what, what their general contribution was, and approximately when did this occur. Refer to this document:

<http://www.cabrillo.edu/~dschwartz/documents/HistoryofOceanographyOutline.pdf>

Focus on Eratosthenes, The Phoenicians, The Vikings, The Chinese Navigators, The Great Age of Discovery, The HMS Challenger (Wyville Thomson), Fridtjof Nansen, Darwin (fringing reefs, barrier reefs and atolls), Alfred Wegener (died in 1930), what he knew, and did not know, 1st sea floor physiographic maps made in early 1960's and **know all the local marine institutions** (such as who is Cal State, UC or Stanford).

Sea Floor Topography: know all given water depths and be prepared to work with them and the lab #2 math. For instance; what ocean floor feature is your RV over if you receive the sound signal 3 seconds later?

Know the characteristics of: the shelf break, rift valleys, transform faults and fracture zones, abyssal hills and plains, seamounts and guyots; what is typical of continental slopes?

Ocean Basin Evolution: Alfred Wegener = (1880 – 1930) Continental Drift, Pangaea, paleoclimates, ice flow direction, fit, stratigraphy

Seismology, Body Waves, know the difference between P and S Waves, know what the lithosphere is composed of, asthenosphere. Practice the characteristics of the ocean crust and the continental crust (ie. Thickness, materials, age and density). Know the definition of SFS and ALL the proofs. Define Plate Tectonic and describe the 3 types of plate boundaries. Practice the geography of plate boundaries and be able to identify leading (active) and trailing (passive) edges. Most ocean lithosphere was formed in the last _____ m.y. and the oldest ocean lithosphere is _____ m.y.?

Marine Sediment: A useful outline of marine sediment is on my web page

http://www.cabrillo.edu/~dschwartz/documents/Sediment_Outline_studyguide.pdf

Review all type of shelf sediment, define the fining seaward sequence. Know the meaning of the following terms: clastic / detrital, authigenic, organic, ice rafted, residual and relic

Define the four types of deep sea sediment: Cosmogenous (think about where we would find higher concentrations and where we would find lower concentrations and why), Hydrogenous (what's an example?), Lithogenous and Biogenous.

For lithogenous review where you expect to find kaolinite, chlorite and montmorillonite and how their distribution in sediment cores is associated with SFS. Know all the biogenous contributors, who is calcareous and who is siliceous and who is and algae, protozoa or animal. Know what types of sediment will accumulate above the ACD and the CCD and what will not. How does all this work with SFS?

Coastal Processes: This is a pretty easy section of the course, but there are a lot of terms. Practice defining all of them, especially; coast, shore, beach, backshore, berm, berm crest, foreshore, inshore, offshore, longshore bars and troughs, barrier beaches (where they are common and not common), spit, tombolo, estuary and drowned river valley. There is a picture of most of this in the back of the Lab Workbook.

Another key theme of this portion of the course is to be able to describe the difference between summer and winter beaches, and know why the changes occur. Summer beaches are broad, with a berm in the backshore and a steeply sloping foreshore, longshore bars are usually absent. The winter beach is lower, often with no berm or backshore. The foreshore slopes gently down to the water and this is the time of the year when longshore bars are more likely to form. Seasonal changes in the wave climate and lunar cycles and the main factors that result in these changes.

Elkhorn Slough is a drowned river valley, formed by rising sea level flooding into the valley approximately 10,000 – 11,000 years ago. It has been filling up with sediment ever since. In 1946 however, the Moss Landing Harbor was built and the jetties line up directly with the main channel of Elkhorn Slough. As a result, the wetlands are eroding away. Natural tectonic subsidence in central Monterey Bay and subsidence resulting from groundwater overdraft have both resulted in the drowning of the wetlands.

Seawater Chemistry: Review the unique properties of water; max density at 4 degrees Celsius, hydrogen and covalent bonds, water and wood has high heat capacity, rocks and metals have low heat capacity, water has surface tension and adhesive properties. It takes a lot of energy to change the state of water; water dissolves most solids and is known as the universal solvent.

The six major constituents are important; you need to know the names and the symbols. Understand why there are changes in surface salinity and where/why these changes occur. Make a list of the sources of salts in seawater (just the major constituents) and how these salts are removed. Define the Principle of Constant Proportions, Conservative and Nonconservative Constituents and Residence Time.

What are some techniques for determining salinity and desalination? Make a list and make sure you do not confuse the terms.