

Lock Haven University
GEOS 120 - Oceanography
Study guide for test #2

By popular demand, I will include 10 multiple-choice questions (1 point each), 10 definitions (2 points each) and 2 short answer questions (10 points each).

For definitions know the following terms. Also, go back and look up your lab quizzes for some definitions:

Albedo, inclination of solar radiation, cyclone



, anti-cyclone, westerlies,



trade winds

western intensification, Greenhouse effect



, the Great Conveyor Belt, Ekman Spiral, El Nino, La Nina, ENSO, Thermocline, Gyres, Gulf Stream, California Currents,

Equatorial Currents, West wind drift, wave length



, wave period, wave frequency, wave base, shallow water waves, deep water waves, group velocity, seas, swells, fully developed sea, wave height, wave energy, wave energy flux, wave dispersion, wave interference, wave refraction, wave defraction, wave reflection, standing waves, Tsunami, Snell's Law, swash, backwash, rip currents, wave circulation cells, longshore currents and drifts, tides, transgression, regression, emergent coast, submergent coasts, beach, nearshore, offshore, breaker zone, barrier islands, tombolo, wave-cut terrace, sea arch, sea stacks, spit, delta, estuary, salt marsh.

Short answer questions:

- What is the difference between exogenic (external) and endogenic (internal) forces? What forces are responsible for air-sea interactions? [Hints: Know why and how the air interacts with ocean, i.e. understand the underlying factors such as solar radiations, differential heating of earth surface and ocean, various pressure zones, movement of air and underlying water due to pressure differences, role of Coriolis effect, friction, gravity, etc. in air and water movement in the ocean].
- How is the El Nino weather different from "normal" weather? What weather and oceanic parameters (list at least 5 things) change during El Nino? How is La Nina different from El Nino?

- In the context of Earth System science, propose or hypothesize some possible causes of El Nino. How would you go about testing your hypotheses? In other words, list steps that you will take to verify your hypotheses regarding possible causes of El Nino.
- Know the impacts and importance of El Nino weather on fisheries, agriculture, natural disasters (floods, landslides, coastal erosions, disease, etc.), flooding, droughts, beach erosion, and impacts on coral reef damage in various parts of the world, especially on North and South Americas.
- What causes surface ocean circulations, upwelling, downwelling, and deep-ocean (vertical) circulations? Why is it important to know or understand these phenomena?
- Understand the role deep-ocean circulation (i.e. the great conveyor belt) plays in controlling climate and prosperity of the world. How will the global warming caused by the greenhouse effect influence the conveyor belt? What are some possible consequences of slowdown or shutdown of the great conveyor belt?
- What causes tsunami to occur? What measures are taken to understand tsunami movement and to predict tsunami?
- Why is it important to study the coastal zones? What are the major factors that influence coastal processes? Know specific examples of the values and functions of coasts, beaches, and wetlands.
- What are some differences between shallow-water waves and deep-water waves? Know how water particles moves under a deep water and shallow water wave. Know changes a deep-water wave undergoes as it approaches the shallow water.
- Why is it important to understand wave-related features? Give specific examples of various wave related features (such as wave refraction, wave dispersion, rip currents, reflection, longshore drift, wave height, wave energy etc.) as they apply to real-world problems and solution to those problems.
- Know the causes and solutions to coastal erosion. How can you measure or document the amount and rate of coastal erosion along a shoreline (Hint: why do people survey beach profile)? Know the **pros and cons** of various methods that are applied to combat coastal erosion.
- Know different types of coasts (such as transgressive, regressive, emergent, submergent, etc.). Are the shorelines along the mid-Atlantic coasts transgressive or regressive? How can you verify this?
- What is Walther's Law? Why is this law important? In other words, how and where can you apply this law?

- Know various erosional and depositional coastal landforms and features, including those that can be seen along Virginia beaches during our field trip to Wallops Island.
- Depending on what we can cover in the class, you may or may not have to know the basics of tides (i.e. what causes the tide and what factors are responsible for tidal variations from place to place, and what are different types of tides, etc.)