

EAS 100 – Planet Earth
Lecture Topics Brief Outlines
(last update 4/08)

III. Oceanography Section

1. Introduction, Ocean Basin Morphology

Learning objectives: Introduction to oceanography and its significance, the size and shape of ocean basins.

Reading: Text, pages 245-260

Figures to study: Text, Figures 9.1, 9.2, 9.3, 9.6, 9.7, 9.8, 9.10, 9.11

Topics:

Introduction to oceanography – physical, biological (marine biology), Chemical, marine geology.

Significance of oceans – life, sediments, coastline/sea level, ocean/atmosphere interactions, climate effects.

Size and shape of ocean basins – oceans cover about 70% of Earth's surface; distinct ocean basin topography (bathymetry) including shelf, slope, abyssal plain, and mid ocean ridge, and other features such as and seamounts, atolls. Relationship to plate tectonics.

2. Waters of the Ocean, Ocean Currents, Waves and Tides, Shoreline phenomena

Learning objectives: Examine the composition of ocean waters and the concept of salinity. Understand the four main causes of currents in the ocean, ocean waves and tides, and shoreline processes.

Reading: Text, pages 69-71, 85-96, 268-289

Figures to study: Text, Figures 3.4, 3.5, 3.6, 3.12, 3.13, 3.21, 3.24, 3.26, 3.32, 10.2, 10.3, 10.6, 10.7, 10.8, 10.9, 10.10, 10.13, 10.17, 10.20, 10.22, 10.23, 10.24, 10.25, 10.26

Topics:

Composition of ocean waters (~3.5% salinity), the water molecule and resultant, unique properties of water, groundwater

Causes of ocean currents – Tides, Trade winds, Temperature variations that result in density differences, and Salinity variations that result in density differences; global ocean currents

Shoreline processes – Beaches, dunes, wave action; erosion and deposition near the shoreline; the longshore current; human effects on the shoreline

3. Ocean Pollution, Oil Spills 1

Learning objectives: Learn the sources of ocean pollution, the relative significance and effects of oil spills, and the methods that can be used to reduce spills and “clean-up” after a spill.

Reading: –

Figures to study: –

Topics:

Ocean pollution (primarily oil pollution) concepts – complicated issue with political and economic implications. No “easy” solutions.

Focus on the 1989 Exxon Valdez spill in Prince William Sound, Alaska.

Sources of oil pollution – spills, urban runoff, “normal” tanker operation.

4. Ocean Pollution, Oil Spills 2

Learning objectives: Continue discussion, better understanding of science/natural resource issue, socio-economic realities (we use a large amount of petroleum in our daily lives), and environmental impact. What are recovery, reduction and prevention methods?

Reading: –

Figures to study: –

Topics:

Relative size and significance of the Exxon Valdez spill – comparison to other large spills, other sources of oil and ocean pollution.

Recovery methods when a spill occurs. Environmental impact. Clean-up effectiveness.

Oil pollution prevention and reduction methods.

Other major sources of oil pollution and ocean pollution.

5. Marine Biology

Learning objectives: Observe that marine life exists throughout the vast oceans but is concentrated in certain geographic and depth zones because of nutrients. Understand concept of food chain – the base of the food chain is plankton, small organisms that drift passively with currents.

Reading: –

Figures to study: –

Topics:

Marine life throughout the vast oceans, even at great depth; but most life concentrated in narrow, shallow coastal zones because of photosynthesis and upwelling of nutrient-rich waters.

The food chain – plankton (phytoplankton, zooplankton, nanoplankton).

Examples of the diversity of marine life and predator/prey interactions.

6. Other:

Tsunami PowerPoint Presentation:

<http://www.eas.purdue.edu/~braile/new/SumatraEQandTsunami122604New.ppt>

Oceanography section selected PowerPoint slides (Some of the slides shown in class; does NOT include most word slides or slides containing the Figures from the text book):

<http://web.ics.purdue.edu/~braile/eas100/OceanNotes.pdf>