

**GEO 390
EXAM 1
SPRING 2006**

STUDY GUIDE

Exam 1 covers chapters 1-4 in *The Earth System* by Kump et al.

Generally questions will focus on material presented in class and the review questions and key terms at the end of each chapter.

Specifically

Chapter 1

- Key terms: omit acid rain, deuterium, mantle, nuclear fusion, photosynthesis
- Understand the concept of the Earth system.
- Understand current trends in global warming and greenhouse gas concentrations.
- List potential consequences of global warming
- Understand the general locations, mechanisms, and consequences of stratospheric ozone depletion.
- Understand the current trend in deforestation and its consequences.
- List examples of past environmental change.

Chapter 2

- Key terms: All
- Define a system
- Understand positive and negative coupling and how they combine to produce a positive or negative feedback loop.
- Know characteristics of positive and negative feedback loops and how they impact a system state.
- Define stable and unstable equilibrium states.
- Daisy world: Understand how daisies and soil interact to control temperature on Daisy World, Figures 2-9 and 2-10.

Chapter 3

- Key terms: omit barometric law, effective radiating temperature, general circulation model, H₂O rotation band, inverse-square law, radiative-convective model, Stefan Boltzmann law, Wien's law
- Define electromagnetic radiation spectrum (No equations!).
- Describe heat transfer in the troposphere.
- Define/describe the greenhouse effect qualitatively and quantitatively.
- Define Energy balance
- Know the structure of the atmosphere up 100 km and the reasons for temperature trends in each region.
- Define a black body.
- List most prevalent greenhouse gases
- Understand how clouds impact climate.

Chapter 4

- Key Terms: omit Boyle's law and Charles law
- Understand the driving mechanisms for and structures of the north-south and east-west components of atmospheric circulation.
- Understand the relationship between the tilt of the Earth and seasons, Figure 4-15.
- Understand how the physical properties of land and ocean differ regarding heat and energy and how that impacts wind patterns. Understand Continentality.
- Understand heat transport and the phase transitions for water.
- Describe the hydrologic cycle.
- Understand the concept of Saturation Vapor Pressure and how it relates to precipitation.
- Understand how the physical processes driving atmospheric circulation lead to global precipitation patterns.