**STUDY GUIDE FOR EXAM 3**

**Energy and Ecosystems**
- What is biogeography?
- Ecological and historical biogeography: what are they?
- What does “ecology” mean?
- What are the abiotic components of an ecosystem?
- Know definitions of habitat, community, niche
- What are the relative amounts of energy following the *organic* and the *heat* paths?
- What is a *food chain*? A *trophic level*?
- What are the differences between a terrestrial and an aquatic food chain?
- What is an *autotroph*? A *heterotroph*?
- What is the difference between the *detritus* and the *grazing food chains*?
- What’s the concept of an *energy pyramid*?
- How do terrestrial and marine biomass pyramids differ?
- How is energy transferred in *photosynthesis* and *respiration*?
- Know the equations for both.
- What kind of reaction is decomposition?
- What is the difference between *net* and *gross primary productivity*?
- Why is the omnivorous human diet wasteful?
- What is *bioaccumulation*?

**Biogeochemical Cycles**
- What does the term “biogeochemical cycles” mean?
- What are active pools? Storage pools?
- What are examples of active and storage pools in the carbon cycle?
- What are the two main pathways in the carbon cycle that cycles carbon between the atmosphere and biosphere?
- What are the organic and inorganic forms of carbon in the carbon cycle?
- What is *nitrogen fixation*? Why is it important?
- What are the biological and industrial forms of nitrogen fixation?
- What are legumes? What is their role in the nitrogen cycle?
- How are bacteria symbiotic with legumes?
- What is *denitrification* and how is it accomplished in the nitrogen cycle?
- What is outgassing?

**Explanations for Plant and Animal Distributions**
- What are some xerophytic plant adaptations?
- What are some tropophytic plant adaptations?
- What are some hydrophytic plant adaptations?
- Be able to define *aerenchyma* and *adventitious*.
- What are adaptations to temperature for cold and warm blooded animals?
- What is a bioclimatic frontier? How does it explain plant distributions?
Be able to define all of the following: competition, predation, parasitism, symbiosis, commensalism, mutualism
What is ecological succession?
What is the difference between primary and secondary succession? Know examples of each.
What is a climax community?
Know the basics of evolutionary theory.
What is variation?
How does natural selection operate?
What are the two key mechanisms for variation?
What is speciation? Extinction? Dispersal?

**Global Biomes**
Definition of biome
For the following 3 biomes, know:
- The associated climate characteristics, some plant and animal adaptations, the distribution of that biome on the map
  1. Desert
  2. Grassland
  3. Tundra

Additional terms and concepts to know about biomes:
- Arroyo, wash, wadi
- Stomata, ephemeral plants, phreatophytes (wet toes), hydraulic lift
- Prairie vs. steppe
- Why do grasslands survive fire and why is fire necessary to preserve grasslands?
- Alpine vs. arctic tundra
- Permafrost

Know the *relative net primary productivities* of the biomes (the highest and lowest biomes)

**Textbook Chapters. Material from the book not covered in lecture class:**

**Chapter 8:**
Net production and climate, human impact on carbon cycle, geomorphic and edaphic factors, example of dune succession, succession, change, equilibrium, genetic drift and gene flow, geographic isolation, adaptive radiation, endemic species, dispersal and disjunction, read the discussion about biodiversity and endangered species on pp. 295-298.
Figures 8.7, 8.9, 8.10, 8.11, 8.24, 8.38

**Chapter 9:**
What is a savanna?
What is a sclerophyll forest?
Where do they occur?
What are some of the important differences between deciduous and needleleaf forests?
What are epiphytes?
What are buttress roots?
What are lianas?
What are emergent canopies?
Figures 9.6, 9.4, 9.9, 9.34