

# Earth Systems I/Unit 3 Study Guide

## ESIU3SG (Thermodynamics)

### Study Objectives

1. Differentiate among the types of energy and the basics of energy flow. (chapter 4)
  - a. Compare and contrast potential energy and kinetic energy.
  - b. Explain the first law of thermodynamics and cite examples.
  - c. Describe the second law of thermodynamics and relate it to the Ecological Pyramid.
2. Summarize the importance of photosynthesis, respiration, and chemosynthesis to living things and energy flow. (chapter 4)
  - a. What is the primary source of energy for ecological systems?
  - b. Describe how autotrophs and heterotrophs are linked ecologically.
  - c. In what environments does chemosynthesis occur?
3. Compare and contrast the major types of species interactions.
  - a. What are the different types of species interactions?
  - b. What is the effect on each of the players in the above interactions?
  - c. Explain the difference between fundamental niche and realized niche.
4. Characterize feeding relationships and energy flow, using them to construct trophic levels and food webs.
  - a. List and describe the 4 trophic levels that are found in ecological communities.
  - b. Describe how each of the following changes at higher trophic levels:
    - i. Energy
    - ii. Biomass
    - iii. Numbers (population)
5. Distinguish characteristics of a keystone species.
  - a. What are the characteristics of a Keystone Species?
  - b. Carefully describe an example of a Keystone Species and its influence in its ecosystem.

### Vocabulary

amensalism   commensalism   competition   food webs   fundamental niche   herbivory  
invasive species   keystone species   mutualism   parasitism   predation   realized niche  
resource partitioning   symbiosis   trophic levels   entropy

### Assignments

- ✓ Reading: chapter 4 (pages 103-108); chapter 6 (pages 148-165)
- ✓ Notebook: **10pts**
  - Video Assignment: Nature "Great White Bear" [www.pbs.org/wnet/nature/whitebear](http://www.pbs.org/wnet/nature/whitebear)
  - 2-column Notes on Study Objectives
  - Food Web/Diet Footprint Handout (page 115)
  - Case Study - "Inferring Zebra Mussels' Impacts on Fish Communities" (page 149, 150, 160, 161)
  - Case Study - "Otters, Urchins, Kelp, and a Whale of a Chain Reaction" (page 164, 165)
- ✓ Ecological Pyramid Model **10pts**
- ✓ Owl Pellet Investigation **10pts**
- ✓ Quiz **10pts**
- ✓ Test **20pts**

### Misconceptions:

<http://ecomisconceptions.binghamton.edu/misconceptions.htm>