

Earth Systems I/Unit 3 Study Guide

ESIU3SG (Thermodynamics)

Study Objectives

1. Differentiate among the types of energy and the basics of energy flow. (103-105)
 - 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. (105-108)
 - 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. (150-156)
 - 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. (156-159)
 - 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)
 - c. Diagram a typical **food web** from a forest **ecosystem**. Include at least 15 organisms with representatives from each of the 4 trophic levels.
5. Describe characteristics of a **keystone species** and characteristics of an **invasive species**. (159-168)
 - a. What are the characteristics of a Keystone Species? Give examples.
 - b. Carefully describe an example of a Keystone Species and its influence in its ecosystem.
 - c. What are the characteristics of an Invasive Species? Give examples.
 - d. Carefully describe an example of an Invasive Species and its influence on an ecosystem.

Terms to be familiar with:

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

To-do list:

- ✓ Reading: chapter 4 (pages 103-108); chapter 6 (pages 150-168)
- ✓ Notebook: **10pts**
 - Video Assignment: Nature "Great White Bear" www.pbs.org/wnet/nature/whitebear
 - Notes on Study Objectives (right side)
 - Reflections/Summaries
 - Diet Footprint Handout (page 115)
- ✓ Ecological Pyramid Model **10pts**
- ✓ Owl Pellet Investigation **10pts**
- ✓ Quiz1 (SO's 1-3) **10pts**
- ✓ Quiz2 (SO's 4 and 5) **10pts**
- ✓ Exam **20pts**

Misconceptions:

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