1. What is *ecology*? What five levels of the organization of matter are the main focus of ecology?

2. Distinguish among *between a eukaryotic cell and a prokaryotic cell*.

3. Distinguish among a *species, population, community, ecosystem*, and *biosphere*.

4. Sketch **figure** *3-6 pg 54* of your book and label and describe the following areas: *atmosphere, troposphere, stratosphere, hydrosphere, lithosphere*, and *biosphere*.
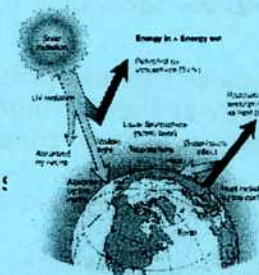
5. How does the sun help sustain life on the earth? How is this related to the earth's natural greenhouse effect?

6. What are *biomes*, and how are they related to climate?

7. Distinguish between the *abiotic* and *biotic* components of ecosystems, and give an example of each.

8. Describe in your own words the *range of tolerance* concept; how does this range of tolerance idea affect the composition (structure) of ecosystems?

9. What is a *limiting factor*, and how do such factors affect the composition of ecosystems? What are two important limiting factors for (a) terrestrial ecosystems and (b)aquatic ecosystems?

10. Distinguish between *producers* and *consumers* in ecosystems, and give three examples of each type. What is *photosynthesis*, and why is it important to both producers and consumers? What is *chemosynthesis*?

11. Distinguish between a *food chain* and a *food web*.

12. Distinguish among *primary consumers (herbivores), secondary consumers (carnivores), tertiary consumers, omnivores, scavengers,* and *decomposers*. Why are decomposers important, and what would happen without them?

13. Write the equation for basic *aerobic respiration* and *anaerobic respiration*. What features do these two processes share in common?

14. What are the four components of biodiversity? Why is biodiversity important to (a) the earth's life-support systems and (b) the economy?

15. What is *biomass*?

What is the *pyramid of energy flow* for an ecosystem? What is *ecological efficiency*? What is the effect of the second law of thermodynamics on (a) the flow of energy through an ecosystem and (b) the amount of food energy available to top carnivores and humans?
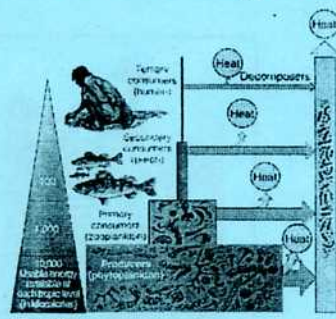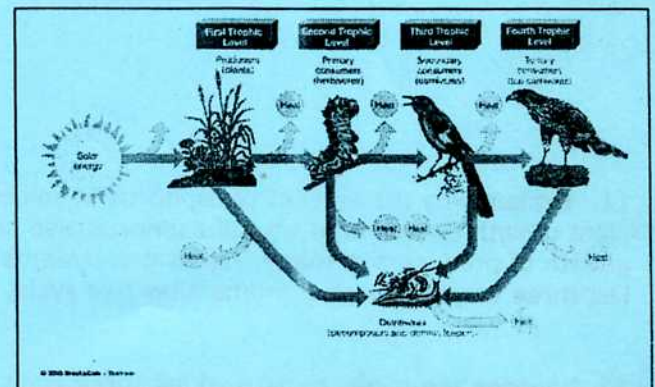
1. Distinguish between *gross primary productivity* and *net primary productivity*. Explain how net primary productivity affects the number of consumers in an ecosystem and on the earth. List two of the most productive ecosystems or aquatic zones and two of the least productive ecosystems or aquatic zones.

2. Explain in your own words what NPP = GPP- R means.

3. About what percentages of total potential net primary productivity of (a) the entire earth and (b) the earth's terrestrial ecosystems are used, wasted, or destroyed by humans?

4. What is *soil*? Distinguish between a *soil horizon* and a *soil profile*.

5. What is *humus*, and what is its importance? What does the color of topsoil tell you about its usefulness as a soil for growing crops?

6. Distinguish between *soil infiltration* and *leaching*. What do *soil texture*, *soil porosity*, and *soil permeability* indicate about the productivity of certain soils

7. What is a *biogeochemical cycle*?

8. What two major processes influence the water cycle. List two things that humans do that interfere with the water cycle

9. Describe the *carbon cycle* and explain the roles of photosynthesis and aerobic respiration in this cycle. List two human activities that alter this cycle.

10. Describe the *nitrogen cycle*. Distinguish among *nitrogen fixation, nitrification, assimilation, ammonification*, and *denitrification*. Explain why the level of nitrogen in soil often limits plant growth. List six ways in which humans alter this cycle.

11. Explain why the level of phosphorus in soil often limits plant growth on land and why phosphorus also limits the growth of producers in many freshwater streams and lakes. List three ways in which humans alter this cycle.

12. Describe the *sulfur cycle*, and list three ways in which humans alter this cycle.

13. Distinguish among *field research, laboratory research*, and *systems analysis* as methods for learning about ecosystems.