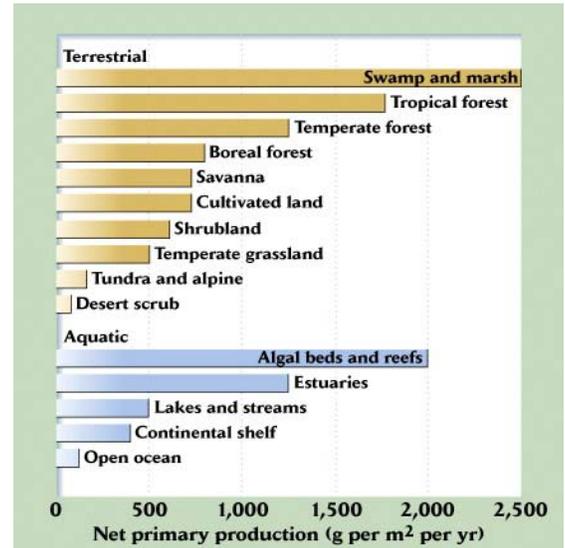


Multiple guess. Pick the best answer. [5 points each, 40 pts total]

1. Leaves of C₃ terrestrial plants are green because
 - a. chlorophyll is green.
 - b. chlorophyll absorbs green light.
 - c. chlorophyll is brown.
 - d. chlorophyll is blue and red.
 - e. none of the above.
2. We discussed how plants exhibit plasticity. This refers to how a plant can
 - a. change its growth patterns during growth.
 - b. resist damage during extreme environmental events.
 - c. produce more flexible reproductive structures than other tissues due to their importance.
 - d. all of the above.
 - e. none of the above.
3. Hadley cells are responsible for
 - a. global warming.
 - b. cycling between el Niño and la Niña.
 - c. equatorial rains and deserts at about 30 degrees N & S latitudes.
 - d. plate tectonics.
 - e. all of the above.
4. Concerns about global warming are
 - a. partially the result of the known correlation between atmospheric CO₂ concentrations and global temperatures over the past 0.16 million years.
 - b. largely unfounded due the lack of evidence coupling human activity and global warming.
 - c. due to the expansion of the sun, which is expanding in size and is expected to engulf the Earth in approximate four billion years.
 - d. due to all of the above.
 - e. a function of something other than those things mentioned above.
5. Genesee was covered in ice from the last glacial event approximately
 - a. 1,500 years ago.
 - b. 15,000 years ago.
 - c. 1.5 million years ago.
 - d. well, like never!
 - e. none of the above.
6. Turnover in lakes is due to
 - a. seasonal changes in temperature.
 - b. increased winds that mix lake water.
 - c. the introduction of new species that leads to the collapse of native populations.
 - d. all of the above.
 - e. none of the above.

7. If visited by aliens and asked the question “how many species are on your planet?” you would say about
- 1,000.
 - 10,000.
 - 100,000.
 - 1,000,000.
 - 10,000,000.
 - >100,000,000.

8. The figure on the right is from your textbook. The terrestrial community “swamp and marsh” and aquatic community “algal beds and reefs” produce high levels of NPP. If we standardize these values on the amount of biomass which system is most efficient by a large margin (produces the most new growth per unit biomass)?
- tropical rain forest.
 - cultivated land.
 - algal beds and reefs
 - open ocean.
 - None is more efficient - all ecological systems are governed by thermodynamics which constrains efficiency.



Shortest Answers. Please provide short answers (restricted by the room available) to **TWO** of the following four questions [5 points each, 10 pts total]

1. Provide the three reasons we have seasons on Earth (be precise!) [L, TB]

- _____
- _____
- _____

2. What subdiscipline of ecology involves questions such as

How do dandelions deter herbivory? _____
 Why do male lions commit infanticide? _____

3. What are the two reasons we use mathematics and statistics in the science of ecology?

- _____
- _____

4. Identify three roles of ecology in society.

- _____
- _____
- _____

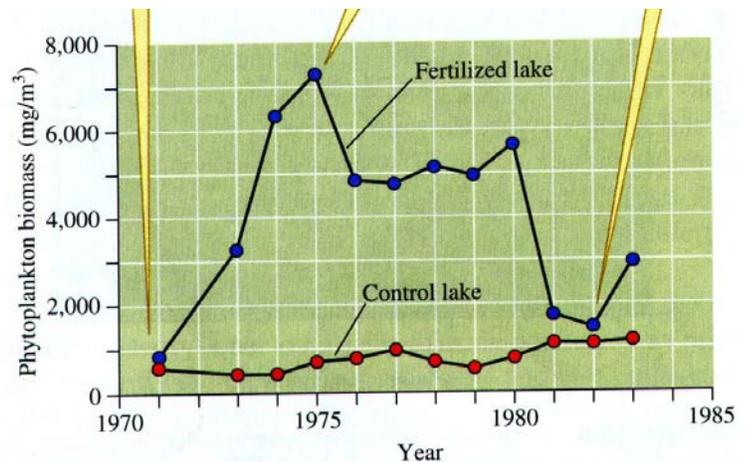
Longer Answers. Answer **THREE** of the following five questions. [10 pts each, 30 pts total]

1. Draw the relationship between population growth rate and the an environmental factor. Label the different “zones” on the graph and describe an example using the graph with a properly labeled x-axis.

2. Graph the relationship between net primary productivity and latitude on Earth.

3. Thoroughly explain the main result of the graph to the right **and** the main reason you should be skeptical of this result.

Main result:



Reason for being skeptical:

4. Draw arrows from each factor that affects another, with thickness representing importance. Discuss one interaction (one of your arrows) for which humans are causing an important effect or change.

RADIATION

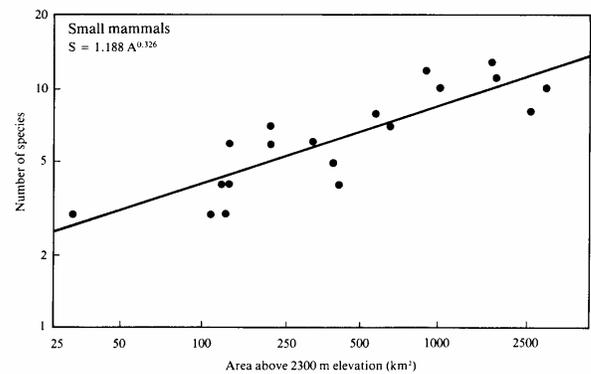
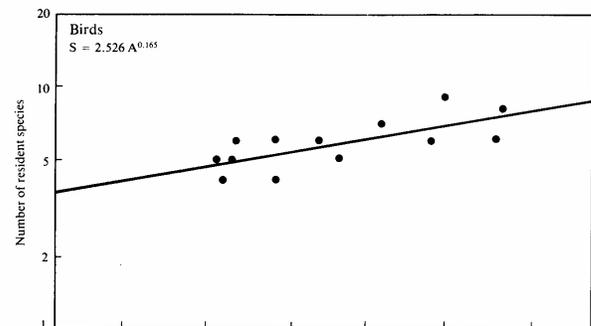
CLIMATE

PLANT PRODUCTIVITY

SOILS

GEOLOGY

5. The diagram to the right shows the number of species of birds (above) and small mammals (below) as functions of area for mountain tops in Nevada. Explain two important conclusions can you draw from these data?



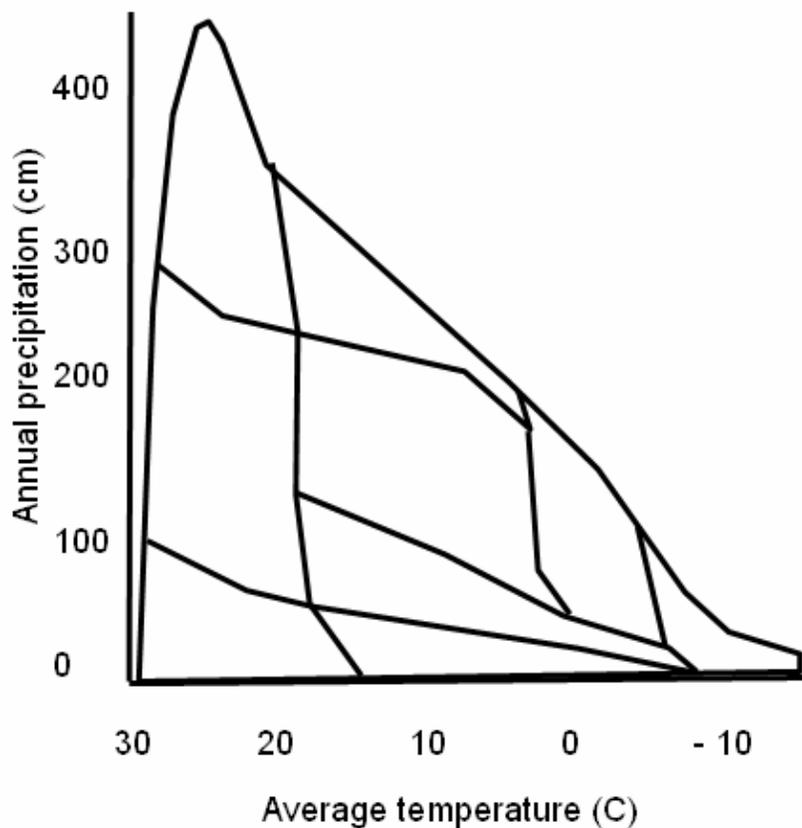
Mandatory Medium-Length Answers. **Answer both.** [10 pts each, 20 pts total]

1. a-d: What are the four easily observed characteristics of natural selection? (write legibly!)

- a. _____
- b. _____
- c. _____
- d. _____

e. **Draw a histogram** of an example of “balancing selection” from the Arboretum and discuss why you think this is balancing selection.

2. Identify **FIVE** biomes in the following diagram.



Extra Credit

1. How many people are abducted by aliens each year in the USA? [1 pts]
2. What is causing colony collapse disorder (CCD) in honeybees? (1 pt for close, 3 pts for exact).
3. Male chimps in Guinea have been found offering what for sex with females? [1 pt]