Exam II
Fall Semester, 2008

Name

Lab Day and Time

1. Make sure to print your last name in the upper right-hand corner of each page.

2. Do not use red lead or red ink to complete this exam.

3. Take off your hat or turn the bill around backwards.

4. Read each question carefully before you begin to answer.

5. Check your answers before handing in your exam.

6. Do not cheat or appear to be cheating. Cheaters will be prosecuted.

7. Exams will be returned as soon as possible. You will be notified when and how exams will be returned.

Good luck.
3 pts. Label each question R (respiration), P (photosynthesis), N (neither), or B (both).

_____ increases the weight of the plant
_____ occurs in all living cells in both light and darkness
_____-ATP is produced at some time during the process

3 pts. What are the three chemical elements (macronutrients) that make up sugar?

What are the three most important chemical elements (macronutrients) in all biological molecules?

2 pts. Place the following words in order (1 is first, 4 is last) in terms of the path of energy in photosynthesis.

_____ chlorophyll electron, _____ light, _____ ATP and NADPH, _____ sugar

4 pts. Suppose you have a redwood tree in Oregon during the summer. Arrange the following words in the order (1 is first, 7 is last) that explains how water first gets into the soil and then up the tree.

_____ water diffuses into root hair cell; _____ droplets of fog collect on the leaves; _____ transpiration pulls water up and out; _____ cell walls imbibe water (imbibition); _____ fog drip seeps into the soil; _____ water molecules are cohesive in xylem; _____ water passes through endodermis

4 pts. Label each of the following plant movements as either: a tropism (T), a nastic movement (NS) or a nutational (NT) movement.

_____ plant bending toward light; _____ twining plant swinging in a circle; _____ flower closing when the temperature drops; _____ leaves of sensitive plant closing when you touch them

3 pts. What does each of the following parts of a flower become after pollination and fertilization?
   a) ovule-
   b) ovary-
   c) egg-

3 pts. Give two characteristics of fruits or seeds that are dispersed by the wind.
   a)
   b)

3 pts. Give two characteristics of fruits or seeds that are dispersed by animals.
   a)
   b)

4 pts. First, sketch a tree that does NOT have apical dominance.
Then show fruits on the right side sprayed with gibberellin, and fruits on the left that have not been sprayed with gibberellin.
3 pts. What is the main **function** of **photosynthesis**?

4 pts. Suppose you find a plant (A) growing on another living plant (B), but you don’t know if Plant A is a parasite or an epiphyte. If plant A is an **epiphyte**, should the growth of Plant B increase, decrease, or remain about the same when Plant A becomes attached to Plant B? Choose one, and then explain.

3 pts. Gardeners often create **compost** heaps, throwing all the left-over food and discarded fruits and vegetables into a pile and letting them decay. They then mix the compost into the soil. What is the benefit of doing this? Give two specific ways how compost might help plants grow (hint: think about topsoil).
   a) 
   b) 

3 pts. Think about adaptations to fire and the benefits of fire. Explain how **serotinous cones** are a good thing, especially when fire is bad news for the mother plant that produces the cones.

4 pts. Sketch a cross-section of a **root with spongy tissue**. (we saw one in class).

   Next, how does the form of this tissue help its function?

3 pts. Some people have proposed a solution to global warming---create a modern “nuclear winter” by pumping dust high into the atmosphere. Why do these people want to do this—what would the nuclear winter do?
3 pts. Which of the following does not belong with all the others? Circle one answer, and then explain why you chose that answer: alcohol, oxygen gas, lactic acid, carbon dioxide, only 2 ATP

4 pts. Discuss seed germination. First, explain the role gibberellin plays in the germination of a seed, and then explain the role of auxin in the growth of the root. Illustrate your answer.

3 pts. Explain what might cause a bunch of bananas to spoil faster than a single banana.

3 pts. Bill and Martha have a mature chrysanthemum plant that never seems to flower indoors. They keep it near a lamp with a bright light that they turn on every morning and turn off every evening at the same time. What is the explanation for the chrysanthemum having no flowers?

3 pts. Why is dispersal of seeds and fruits important (instead of having them just drop straight down)?

3 pts. Suppose you have two plants that are growing separately. You transplant them into the same pot. Explain how it is possible that both plants can still grow bigger (after they are put together) even while they are in competition.

3 pts. What is the main function of the light-independent reactions of photosynthesis?
3 pts. In the article, "Philodendrons like it hot and heavy," what is the importance of the many stomata that Philodendrons have?

3 pts. Would you expect ephemeral annual plants to have succulent tissue?  Say yes or no, and then explain your answer.

3 pts. Plants on planet Krypton are all black.  What does this tell you about which colors of light are important for photosynthesis on Krypton?  Explain your answer.

5 pts. Answer the following questions about the diagram on the next page (answer the first four questions on that page, and the last question (e) on this page).

a) Show how many ATP molecules are produced at each of the three stages.
b) What are the “organic molecules” that are produced during glycolysis?
c) What is the function of the oxygen gas (O₂) at the end of the ETC?
d) From what molecule do the C and the O atoms in CO₂ come?
e) What does the Krebs cycle have to do with biological molecules (answer here)?

5 pts. Draw and label a picture showing the light-dependent chemical reactions of photosynthesis, showing where it happens, and what goes in and what comes out.