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

2. Take off your hat, or turn the bill around backwards.

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

4. Keep your eyes on your own exam. Do not cheat in any way OR appear to be cheating. Cheaters will be prosecuted, and your transcript may be marked with a label indicating academic misconduct.

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

6. Check all your answers before you turn in your exam.

Good luck!
3 pts. For what two reasons are plants **essential** to your life?

a) 
b) 

4 pts. What environmental problem did you choose to investigate from the handout in class? What is the current status of the problem, and from what specific resources did you get your information?

**Problem**—
**Status**—

Two Sources—

3 pts. Which of the following does not belong with the others? Circle one answer, and then explain your choice. Stipules, blade, net venation, monocot, petiole.

3 pts. Circle all of the following parts that are found in both plant AND animal cells.

Cell wall, DNA, ribosomes, mitochondrion, vacuole, cell membrane, nucleus, chloroplast

3 pts. One of the **requirements** of a living thing is to maintain its integrity. Name one plant **tissue** (group of similar cells) that is necessary to help a plant **maintain its integrity**, and then give its function.

3 pts. In what way is **mitosis** similar to **plant reproduction** by rhizomes, plantlets, and sucker roots (hint: think about the end results)?

3 pts. Suppose you have a cell with 36 chromosomes in it. At the end of mitosis, how many cells do you have, and how many chromosomes are in each cell?

3 pts. Place the following words in one sentence describing how genes control a cell: gene, enzyme, cell characteristic, messenger RNA, chemical reaction.

4 pts. We talked about two kinds of RNA. First, what is the “message” that messenger RNA carries?

What does transfer RNA “transfer” (and where does it transfer to)?

3 pts. In the corn growing contest, why was it essential to have **two pots of corn** to be able to conclude what caused your corn plants to grow?
3 pts. On the first day of class we talked about the process of science. What does it mean that “science is self-correcting”?

2 pts. We talked about 7 characteristics of living things; for instance, living things are complex and highly organized. Name two other characteristics of all living things.

a) 
b) 

3 pts. Which part of a mature annual plant do you think would weigh more: 1) all of the roots or all of the leaves? Circle one.
Which part of a mature annual plant do you think would have a greater surface area: 1) all of its roots, or all of its leaves? Circle one, and then explain.

4 pts. Give one major function for each of the following:

a) nucleus--

b) stem--

c) tendril--

d) bud scales--

2 pts. What part of a plant (root, stem, leaf, flower, bud, seed, or fruit) are you eating when you eat:

a) an onion?
b) a white potato?

4 pts. First, what is wood?

Next, what causes the lines to form between annual rings in wood (why does a ring stop getting wider)?

3 pts. From one of your handouts, what happens to a chemical reaction when you raise the temperature of the cell?

5 pts. Clearly draw and label one plant with all of the following characteristics:

a) two compound leaves each with three leaflets, petioles, opposite leaf arrangement, and a taproot.

Do you think this plant is an annual? Say yes or no.
3 pts. Here is an illustration from your book (and handout). What is it showing?

Label the lines pointing to different structures in this diagram.

3 pts. Organelles such as chloroplasts have many membranes. What is the importance of the membrane on the outside of the chloroplast?

What is the importance of the membranes on the inside of the chloroplast?

6 pts. What are the three main parts of one nucleotide of DNA?
  a) 
  b) 
  c) 

Which of these three parts is most important in determining the genetic code in a gene?

Why do you think the other two parts could not be the genetic code?

3 pts. Mistletoe is a parasitic plant that attaches itself to a tree. It needs water and minerals to grow, but makes its own food through photosynthesis. Do you think the roots of the mistletoe penetrate to the xylem or to the phloem of the tree? Choose one, and explain.

3 pts. Do you think a plant can have primary growth at the same time it has secondary growth? Say yes or no, and then explain in terms of open growth.

5 pts. Here is a messenger RNA molecule. Clearly draw and label all the parts of a gene that has been turned on and that produced this mRNA.
3 pts. Here is an illustration from your book. What is this illustration showing? (What is the biological concept shown in this drawing?)

3 pts. In what way is the endodermis like a cell membrane (in terms of their function)?

3 pts. How does the form of the spongy parenchyma tissue in a leaf help the function of the leaf?

3 pts. Complex organisms like dogs and trees have organelles. Simple organisms like bacteria do not have organelles. What advantage do cells gain by having organelles (what good are organelles)?

3 pts. Which do you think would take longer for a cell to do: 1) make a protein, beginning with a gene, or 2) make a copy of one chromosome during mitosis? Choose one, and then explain your answer.

4 pts. An article I showed in class had a headline, “Heavy cell phone use tied to poor sperm quality.” The article stated that “in a study of 361 men seen at their infertility clinic, researchers at the Cleveland Clinic found an association between the patients’ cell phone use and their sperm quality. On average, the more hours the men spent on their cell phones each day, the lower their sperm count and the greater their percentage of abnormal sperm.” First, what kind of study was this: an experiment or an observational study? Choose one and explain.

Secondly, based on this evidence, is this a cause and effect relationship? Say yes or no, and then explain.