1. Make sure your name is printed in the upper right-hand corner of each page.

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

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

4. Keep your eyes on your own exam. Do not attempt to cheat in any manner.

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

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

7. Grades will be posted outside of Room 151 by Saturday noon. If you would like, give me a self-addressed, stamped envelope, and I’ll send your grade to you.

Good luck, and have a safe and happy holiday break!
3 pts. For what two reasons are plants essential to your life?
   a) 
   b) 

4 pts. How are each of the following important to the life of a plant? (What is their main function?)
   a) chlorophyll
   b) leaf
   c) cell wall
   d) seed

2 pts. If you have 50,000 alleles in each of your body cells, how many alleles are in each of your gametes?

2 pts. Which do you think happens more frequently in a plant’s body—mitosis or meiosis? (choose one)

4 pts. Give two major differences between mitosis and meiosis.
   a) 
   b) 

3 pts. What three things can happen to the energy that an organism (like you) takes in?
   a) 
   b) 
   c) 

3 pts. Place the following in the order of their occurrence (1 is first, 6 is last) _____ first flowering plants, _____ first land plants, _____ first vascular plants, _____ first photosynthetic organisms, _____ first multicellular organisms, _____ first eukaryotes

4 pts. What is the main function of photosynthesis?

4 pts. Describe one major function of each of the following plant hormones.
   Gibberellin—
   Auxin---

3 pts. What is natural selection? (define it in “English”)

4 pts. Draw the following: one compound leaf with 5 leaflets, a petiole, axillary bud, and stipules.
4 pts. Do you think that growing genetically modified foods is a good idea or not? Say yes or no, and then give three strong arguments that support your answer.

a)

b)

c)

8 pts. Gases play a big role on earth.
First—what is the importance of carbon dioxide gas to life on earth?

Next—what specific role (function) does oxygen gas play in cellular respiration?

Third—why can’t humans make amino acids out of nitrogen gas?

Fourth—what was so important about the production of oxygen gas to the evolution of life on earth?

4 pts. If a plant has the genotype Aa, what kind of gametes can it produce?

In what proportion will those gametes be produced (what percentage will be produced of each kind)?

4 pts. First, explain why some parts of your body have more bacteria and fungi than others (this has nothing to do with washing).

Explain why you should NOT use antibacterial soaps to wash off these microorganisms.

4 pts. How do the following characteristics explain why there are so many species of flowering plants:

a) being able to live on the land

b) having flowers with pollinators

4 pts. If a plant is heterozygous for flower color, how do you explain that the plant produces only one color of flower and not two?
4 pts. Do you think that a person would consume more pesticides if he were a vegetarian or only ate meat? Choose one, and then explain your answer.

3 pts. Would you rather be a spore or a seed? Choose one, and then explain your answer.

3 pts. In your article, “Today’s Unsettling Comparison to The Great Dying,” what is “The Great Dying,” and what is one specific characteristic of today’s earth that is similar to that of the past?

3 pts. What is the evolutionary explanation why plants aren’t black? (what happened in their evolutionary history to explain why plants are green?)

3 pts. Why should we worry about the future of crops such as bananas and potatoes?

4 pts. How can we explain the facts that chloroplasts and mitochondria have their own DNA inside them and that both of these organelles have a double membrane (two membranes).

4 pts. Suppose we cross one plant with round leaves to another plant of the same species with oval leaves. From this information, can you tell which characteristic is dominant (round or oval)? Say yes or no.

If all of the F₁ plants have round leaves, what are the genotypes of the two parents?

3 pts. What happens when crossing-over occurs in meiosis (what is the result)?

3 pts. What is the function of the pollen tube?
5 pts. There are many islands near Antarctica; it is very cold there most of the year. Flowering plants grow on these islands. Do you think that these plants are pollinated by the wind or by bees? Choose one, and explain.

Give three characteristics of a flower typically pollinated by the pollination agent you just chose above.
a) b) c)

4 pts. What’s the importance of inferior ovaries of flowers that are pollinated by hummingbirds?

What’s the importance of deep, narrow tubes of flowers pollinated by butterflies?

3 pts. Which biome has permafrost?

Name the country in North America that has the largest amount of the biome you just named.

6 pts. Use all of the following words in ONE sentence to describe how a gene controls a characteristic, such as blue flowers: enzyme, gene, DNA, messenger RNA, chemical reaction, blue flowers.

4 pts. In terms of net primary productivity, why is the ocean called a “watery desert?” (be sure to define net primary productivity)

6 pts. Suppose there are two organisms interacting with each other. How could you tell if this interaction was a mutualistic relationship, a parasite/host relationship, or competition?

Mutualistic—

Parasite/host—

Competition—

3 pts. How can you explain that different parts of the world have the same biome (for instance, grasslands can be found on every continent)?

5 pts. Explain how all of the following are related to each other (how they are connected by their function). Roots, vacuole, cheap growth, xylem, endodermis