

General Biology: Plants and People
Spring 2007
Review Questions for the Third Exam

My philosophy is that exams should be both a learning experience and an evaluation. Consistent with my view, I give you a set of questions that may appear on the exam before the exam.

The third exam will include about 40 questions and is worth 80 points. About 32 of these questions will be multiple-choice, fill-in-the-blank, or true-false questions. The remaining 8 or so questions will be short-answer style questions, chosen from the questions on this sheet. In addition, most questions on this sheet that are not chosen for short-answer questions will be converted into multiple-choice, fill-in-the-blank, or true-false questions.

Advice

Be concise in answering the questions: a paragraph (1/3 to 1/2 a page) is enough for any of them. Figures or tables may be appropriate for some questions. Note well: being concise does not mean giving a minimal answer. You should --- of course --- give as much relevant detail as possible in a half a page or less.

On the other hand, do not use a "shotgun" approach to answer questions. Use the shotgun approach to answering questions only as a last resort, not a general way of answering questions. In a shotgun approach, you would write anything that seems connected to a concept, and like a shotgun blast spray pellets of information that may not be directly relevant to the question. If you have little idea how to answer a question, this is a decent strategy, because at least some of what you say may earn you some credit. On the other hand, don't shotgun if you think you have a clear idea of how to answer a question, because shotgunning indicates some misunderstanding.

Be prepared to use terminology, but use it correctly. For example, you must understand the meaning of the term *plasmid* to explain the nature of a transgenic crop. It's too easy to veer off course when you don't know the correct term for a concept and instead try to explain it in common language.

Lists, figures or tables may be appropriate for some questions. **Figures must be large and neatly labeled. Tables must have labeled columns and rows.** What is wrong with the following table?

	Leaves	Height	Trait
Banana	Large	Tall	Yellow fruit
Bamboo	Green	Tall	Woody stem
Begonia	Hairy	Tall	Evergreen

I encourage you to discuss these amongst yourselves, use your notes, and the textbook. Please do not ask the instructor to recite the answers. The goal here is learning and critical thinking, not whether you can recite what the teacher says. You may ask the instructor to clarify a question if it is unclear. Be certain that you understand this: the point here is not that you shouldn't ask for help, but instead that you bear the burden of effort here. If you're lost, ask for help.

Questions:

1. Oprah Winfrey (love her or not) once said: "My idea of heaven is a great big baked potato and someone to share it with." First of all, doesn't she know that you should never end a sentence *with* a preposition? Evaluate the health benefits of a meal of potatoes.
2. On an episode of Survivor, you presented with a choice of eating potatoes or sweet potatoes or cassava for two weeks. If nutrition was your only concern, which would you choose? Justify your answer.
3. Discuss the importance for humans of the fact that many legumes have root nodules. In your answer, consider what is accomplished in the nodules, why it benefits the legume, and how it makes legumes useful to us.
4. Soybeans are considered to be one of the most versatile plants, and are used for a variety of food products.
 - a. List five food products that are made from soybeans.
 - b. Briefly discuss the known or potential health benefits of consuming soybean products.
5. An old saying equates low wages to "working for peanuts", a rather unflattering comment about the legume. Evaluate a diet consisting of only peanuts.
6. In a labeled table, compare traditional plant breeding and transgenic plants. Include at least four differences in your table.
7. Sketch a labeled diagram summarizing the process of creating a transgenic plant cell (not the whole plant) by use of the bacterium *Agrobacterium tumefaciens*. Use appropriate terminology for your labels.
8. Provide a rationale for continuing to develop biotech (transgenic) crops, despite concerns raised by environmentalists or consumers.
9. Provide a rationale for continuing to produce organic crops, despite the potential benefits of transgenic crops.
10. Briefly describe the importance of the following practices used in agriculture:
 - a. crop rotation
 - b. polyculture crops
 - c. seed banks
11.
 - a. What is the Green Revolution?
 - b. Has the Green Revolution been a success? Defend your answer.
12. Fermentation is commonly used to create a variety of foods or drinks.
 - a. What is fermentation? (Provide a general definition.)
 - b. Briefly describe the diversity of food products or drinks and organisms that involve fermentation. Include three or four examples in your answer.

13. By use of a labeled diagram, describe the sexual life cycle of a mushroom-forming basidiomycete, such as *Agaricus bisporus* (the common grocer's mushroom).
14. Many people cringe at the thought of fungi. Nevertheless, fungi are important to humans in a variety of ways. Describe four benefits of fungi for humans. For each benefit, provide an example (name) of a fungus that provides the benefit.
15.
 - a. What are the basic ingredients required for alcoholic fermentation?
 - b. What is consumed and what is produced in the fermentation?
16.
 - a. What is malt? Why is it necessary in the brewing beer?
 - b. What are hops? Why is it used in brewing beer?
17. Some wines are sweet; some are dry. Explain three ways that winemakers can control the sweetness of wines. In your answer, be certain that you consider both the ingredients used and the process of winemaking.
18. A friend wants to brew her own beer. What advice would you give her about creating a beer that has the following properties at the time it is bottled?
 - a. Low carbonation and high alcohol content (6-7%)
 - b. High carbonation and high alcohol content (6-7%)

Expecting a topic to be included in the questions above, but it is not? Keep in mind that it may very well appear in other questions on the exam. These study questions are NOT a comprehensive guide to what could appear on the exam. See the class handouts and your lectures for other concepts that may be included in the exam.