

# Study Guide for Success in Introductory Microbiology

or

## Who wants a GOOD Grade in Introductory Microbiology?

Like many other courses, there are lots of things to know (memorize) and understand (concepts) how microbes work. Microbiology has all of this and in addition must cover all the fundamental aspects of biology using microbes, mainly bacteria, as the organisms of study. Thus, to do well, one has to be able to answer all the questions on the exams correctly. The exam questions probe facts (things to know) and concepts (how well one understands Microbiology) and microbiological problem solving. While the exams are largely multiple choice, they do have problems that require a mathematical solution and conceptual problems. AND, they all come from LECTURE and the Clinical Case Studies, Critical Thinking Questions and Self-Quiz at the end of each Chapter.

The textbook's web site has self grading practice exams as well as other study aids and links to other microbiology sites. Because the textbook is thorough it is impossible to cover everything in every chapter in lecture. Thus, the lectures are a distillation of the most important salient features of Microbiology. This is one of the keys to success: Dr. Makemson makes up exam questions from the material considered to be the most important, and all of that is presented in lecture. If you know all this material you will do well. So how do you do that?

### THE BIG MISTAKES STUDENTS MAKE:

1. All the stuff is on the web....you **don't have to go to lecture**, all the material is there: the prof puts up his PowerPoint slides as handouts. This is so stupid it will make sure you get a very low grade. The whole purpose of lectures is to go over what is most important - that is what will be on the exam. Lectures "give-away" what will be on the exam.

2. **You don't have to study hard for multiple choice exams**, these are easy. Think again, the average grade on these exams is failing. Multiple choice questions can probe deeply, it takes far more than recall to be able to answer questions such as:

Q: In a cross of *Escherichia coli* str<sup>s</sup> leu<sup>+</sup> with a *E. coli* str<sup>r</sup> leu<sup>-</sup>, the medium that will show the recombinants only would be:

- a. Nutrient Agar.
- b. Glucose minimal.
- c. Glucose minimal + streptomycin.
- d. Nutreint Agar + streptomycin.
- e. Glucose minimal after penicillin selection.

Questions such as this make up the bulk of the exams and require BOTH knowledge and thought. For this question you have to construct the two possible genetic recombinants and then find the medium on which neither parent-type could grow, but only one of the two possible recombinant types would grow.

3. You don't have to study until the day before the exam. This perhaps the most used WORST method. You need to know the stuff **way in advance** so that you can think about it weeks before the exam. Knowledge is nothing without thought.
4. Use flash cards to memorize. This supports fragmentary knowledge...not linked to anything but what is on the note card. You need to know the material in an integrated way: all in relationship to each other.

## WHAT TO DO?

**FIRST is Attitude:** you can have a real positive, I am going to get this and know it well attitude; or, you can have a "get-by" attitude or "just don't give a damn" attitude. For the last attitude, university might just not be the right place for you. For the get-by attitude, you will struggle hard to barely pass and might not. Remember this course is part of YOUR CAREER, it starts NOW. Let's say your a Nursing major, would you like the nurse who is going to work on you to have a "get-by" attitude? So, are you going to be serious about your career? From the beginning, a positive attitude will put you above many in the class, now if you combine that with a systematic approach to study, you should do well. But when it comes to exams =>

### **SECOND the Steps:**

1. Come to lecture with some idea of what will be going on. Skim read the chapter before the lecture to see what is really important. When you do you will see parts of the chapter having more importance than others....and how they are related to material we covered earlier and will cover later. If you don't prepare for lecture, you will be coming to lecture dumb: have no idea what the material is about; seeing this for the first time and have not had any time to think about it. Students without preparation tend to either copy down every word the prof says not knowing what is the most
2. Immediately after lecture, go through your notes and the book to make sure you understand everything. Do the end of chapter Self-Quiz to test yourself out (don't put this off or you will get behind!) and then the Critical Thinking Questions. The answer for the Self-Quizzes is in the Appendix of the text....so you can find out how well you are doing and focus on studying what you don't know.

One of the hardest things students cope with is what they don't know. From your reading of the chapter make a list of what you don't know completely...then go through the list with FOCUSED reading. Then test yourself out on this material with the book closed. If you look at the answers first, you will only fool yourself into thinking you know the answers...and then be disappointed with the results on your exams later on. If it still is a problem, get in contact with your prof or Lab instructor by e-mail or office hours. Get it resolved way before any exam AND before the next lecture.

3. The most important strategy is to know the material with the book and lecture notes CLOSED and the computer OFF. If you study with the book open, lecture notes open,

you can convince yourself that you know the material...the material certainly makes sense when you are looking at it. But, the exams are not open book. Therefore, to get the high grade you need to make the resources of the course valuable. Before the exam, test your knowledge of microbiology thoroughly with the books and notes closed pretend to give the lectures, then check if you got it all right. OK, now begin on 1 above for the next lecture! And in that lecture you will have confidence of knowing what you have accomplished!

There are lots of other ways to study. Many like to study as a group, this is generally good during the initial stages of preparation, but NOT just before an Exam..the group tends to get partial-group knowledge rather than complete-individual knowledge. They are a fun way to past the time, but remember it is you, not the group that has to take the Exam.

4. Start your review for the test at least a week before the test. As you go through, ask why were certain questions chosen for the Self-Quiz, what material is not on the Self-Quiz and then make up questions about that material.

Most importantly, if there is anything that just doesn't seem right or that you have a hard time understanding GET IN TOUCH with the Prof. right away...in his office, OE226 (or he might be in his lab, OE 263) or through e-mail. The most important thing you can do is know and understand Microbiology.