**How to Study for Organic Chemistry**

Organic chemistry is a difficult subject... and a challenging course. It covers a lot of demanding material. It uses its own language, and employs many very precise concepts, yet without referring to mathematical models.  You can, however, become quite good at it in a semester or two. You should be able to use the basic concepts to understand a lot about the molecular world around you, the world of biochemistry, medicine or material science.

Observations made over the past few years suggested some generally useful strategies that help to improve student performance. Here is a list of five things to do to succeed in organic chemistry.  Remember, you REALLY have to put in the effort!

1. **Read the chapter material before (!) the lecture and attend all lectures**

I mean read (not study, see below). And I mean attending all lectures (sleeping in your seat does not count).  If you read before, you will be more attentive in class and you will take better notes (since you know what's in the book). You will also know better when and what to ask during the class (instructors love good questions).  Even if you are not finished with the previous material, read forward. The time in class well spent will minimize your studying hours; it is a very good investment.

1. **Study every single day, do reviews weekly, and stay caught up!**

Studying means organizing the material (reviewing the reactions, rewriting the mechanisms, maybe even redoing your lecture notes) and it means making the logical connections (building a framework) with what you know, learning the new terminology and building mental or "real-world" models of the new ideas. You should constantly probe your understanding by asking (and answering) the question "why?" in relation to all statements and logical constructions that you encounter. Doing "a little" every day is much more efficient, than trying to do "everything" at once. Most importantly, **do not fall behind in your study**; it is virtually impossible to prepare well for the exam in just a few days before it. You should develop a good exam preparation strategy!

1. **Solve as many problems as possible**

Reading and understanding the material (passive understanding) is insufficient; you should be able to use the just learned concepts in situations not previously encountered, and make logical connections with concepts learned previously (active understanding). The best way to achieve such understanding is by solving problems. Organic Chemistry is done with a pencil and paper in hand and your instructors test your understanding by giving you collections of problems to solve.  Start by working on in-chapter-problems as soon as possible, so you can raise questions in class while the material is still being covered.  Then progress to the end-of-chapter questions and the posted problems sets and other problems.  If you are stuck on a problem, look back through the chapter, your notes or the web pages to find the relevant material. Then try again. If necessary come back to the problem the next day, or during your weekly review. Use your smart friends or office hours to get hints and directions. Resort to the answer book only after you have seriously attempted the problem. If you finally get to the correct answer, you must also find out why you had difficulties with it in the first place; and fix the discovered deficiencies. If you simply read problems and then turn to the answers, you gain very little in your understanding.  You must **DO** the problems.

1. **Study with a friend**

Not just sit and read together. Ask each other the toughest questions you can. If you can explain a concept to your study mate, you know you understand it.

1. **Get help when you need it**

Do not postpone until the next week. Discuss your progress and problems encountered with the TA's and the lecturer. Come prepared with questions and the background material.  If you have done your homework, the help session will be much more productive. Remember you not only want to know the answer to a specific chemical question, but also how to arrive at the correct answer, and *why* you could not do it without assistance. Be self-critical.

Sounds like a lot of hard work? It is. But, it could also be a lot of fun, learning how the world around us is built and how it operates. Life after all is just organic chemistry.  You can also get a lot of satisfaction from doing well in one of the most challenging courses, and even get into a medical school. 

To learn, YOU must do the work. Your instructor can only help you by emphasizing the important, explaining the difficult, and testing the learned. You pay in money, pain of new neuron connections, and precious time.  On the latter subject, of study hours, how many you ask. For A or B performance invest at least 3 hours per each lecture, if you are aiming for the average (C) you may be able to do it with a little less.

OTHER OBSERVATIONS:

1. What are the warning signs?

A. The inability to answer book questions without the answers. Are you reading the book carefully? Are you taking a good set of notes? Also, the inability to follow a lecture or not being able to answer why and how a reaction takes place are also indicative of a student who is not going to do well. Be able to answer some simple questions and build on these concepts to answer more difficult ones. Fix deficiencies from the earliest possible moment.

B. A below average (or worse) performance on the first exam is cause for a major concern. Relying on a simplified approach (memorization) or a compressed study period leading up to the exam might be to blame. How late did you have to stay up the night before the exam? Organic chemistry is best done when well rested. Do not try to cram too much material in too short a time!

1. Understanding the how and why of a reaction or concept will lead to a higher score and an easier time preparing for the final. Many scores start high only fall gradually throughout the semester. These are students who failed to put in the effort after the first exam (over-confident) or who relied on memorizing the material rather than understanding and building on a concept. Organic is an amazing subject because of its hierarchical nature. Learn a few simple concepts and you can explain and solve new problems throughout the year.
2. Withdrawing from the course is not the worst thing you can do. Getting behind early is hard to overcome but it is not a crime. Do not get a bad grade because of an error in judgment—learn from your mistake and start again. Many students have withdrawn from the course and gone on to get an A in both semesters.

Prepared by Dr. Chris Falzone, Department of Chemistry, Johns Hopkins University