ORGANIC CHEMISTRY TIPS

Note: These are some general recommendations that may be useful. We understand that everyone has a different learning style, so feel free to take and adapt any of these items to whatever suits your style.
(The blue text means there's a website related to it, written in the smaller font size)

Before you begin, think big! "Succeeding in this course will help me accomplish…"
"I am at Columbia University because I've worked so hard. My mentors believe in me, and I believe in myself. I belong here and I will succeed." This is an interesting TED talk: Amy Cuddy.
http://www.ted.com/talks/amy_cuddy_your_body_language_shapes_who_you_are.html

This course will enable you to build skills based on "Bloom's Task-Oriented Question Construction Wheel" (2004 St. Edward's University Center for Teaching Excellence), *a hierarchical learning process*:
1) Knowledge: Information gathering.
2) Comprehension: *Confirming* information gathering and use of knowledge.
3) Application: Making use of knowledge.
4) Analysis: Taking apart.
5) Evaluation: Judging the outcome.
6) Synthesis: Putting together.

As you go through the course, think about where the topics covered fall within the hierarchy above, and what you should do to reinforce your learning.

Additional Resources:
Klein; Organic Chemistry as a Second Language
Klein; Organic Chemistry, 3rd Edition (follows a different order from our text but does a pretty good job)
Vollhardt and Schore; Organic Chemistry: Structure and Function
Clayden, Greeves, and Warren; Organic Chemistry
Ian Fleming Frontier Orbitals and Organic Chemical Reactions
Organic Chemistry notes and other help; http://www.khanacademy.org/science/organic-chemistry
LibreTexts: Organic Chemistry; https://chem.libretexts.org/Bookshelves/Organic_Chemistry
MIT open courseware has lectures, exams, and problem sets.
http://ocw.mit.edu/courses/chemistry/5-12-organic-chemistry-i-spring-2003/index.htm
UC Berkeley Test Bank. https://tbp.berkeley.edu/courses/chem/3A/

Other resources that were recommended to me, but I haven't checked:
Workbook in organic chemistry; http://www.amazon.com/Workbook-Organic-Chemistry-Jerry-Jenkins/dp/1429247584
Practice problems from MSU; http://www2.chemistry.msu.edu/faculty/reusch/VirtTxtJml/Questions/problems.htm
Arrow-Pushing in Organic Chemistry; http://www.wiley.com/WileyCDA/WileyTitle/productCd-0470171103.html

Before you continue, this is a great article:
NY Times: How to get an A- in Organic Chemistry;
http://www.nytimes.com/2013/11/03/education/edlife/how-to-get-an-a-in-organic-chemistry.html

Here's another good read, not about organic chemistry, but a good self-help book: The Power of Habit.
http://charlesduhigg.com/the-power-of-habit/

Lecture Team: ochemcampos@gmail.com, Prof. Luis Campos and TAs.

Lecture Prep:
Textbook: skim through the assigned reading. It's usually a chapter (see the Schedule of Topics posted on courseworks). As you skim through the text, note to yourself the key concepts, new words, and the theme of the section.

Notes on courseworks: these are usually posted an hour or two before class. Do the same as "using the book." skim through the notes.

As you prepare, write down concepts that are difficult for you to grasp. The typical questions that come to mind when you do this are: why? and, how? Write down what needs to be clarified. If you get the answer during lecture, make a note of it. If you noticed that you are still confused, raise your hand and ask in class. If you miss the opportunity, ask the *Lecture Team* or your classmates.

After each lecture, ask yourself, what were the key concepts from today's lecture? How were those concepts demonstrated? How do these concepts fall within Bloom's Construction Wheel?

Participate in recitation sections. Be active solving problems. Waiting for the answer will hamper your learning.

Making habits that help you learn by preparing for lecture will keep you from cramming concepts the day before an exam. Whatever helps you learn, make it a habit. If something you did was not helpful, change it right away. Habits will

become natural over the course of the year, and the skills you learn will help you for other classes, graduate school, or medical school.

Tackling Problems:

do the textbook problems
do problems from the "other resources" section. if you have access to other professors exams, do those.
The TA will post supplemental problem sets throughout the semester in addition to recitation worksheets. These will NOT be graded but you are encouraged to study from them as extra practice.

Avoid doing the problems superficially, consulting the key. The key is *how to work on the problems*: force yourself to power through the problems, pushing your brain to think about what was covered in class and everything you did for Lecture Prep.

As you work through the problems, do not look at the answer key!
Start with a blank set of problems, work through all of them. When finished, grade yourself. Do not spend time looking at the key. Just use it to grade your work. This strategy works best when you work with a partner.

Once you grade yourself, put the key away and go back to the problems you missed, or simply didn't understand. At this point, use your notes, textbooks, and other resources to understand the concepts that will help you solve the problems. do this for every problem you missed. Once you figured out the answers, review your problem sets carefully.

Start the process again with the same set of problems, but work through them explaining yourself what the answer is. Avoid going through your memory bank. Think to yourself, "this is the answer [write it down] because..."
Alternatively, create your own problems! Ask yourself, 'if I turn this from a primary to a secondary alkyl group, how does this affect the chemistry?" "If I want to retain the stereochemistry overall, what should I use?"

When ready for the Practice Exam, simulate quiz or exam settings for yourself. It will help to reduce anxiety on test day. When doing problems, or the practice exam for example, ignore your phone, facebook etc. for 75 minutes and try to do the whole thing. Then check the answer keys (and even your phone afterwards as a reward!) to see what you didn't understand. If you're looking for an alternate explanation to help you understand, reach to your resources.

The best way to grasp a concept you don't understand is by trying it first. Asking for help before you attempt will have less impact on your understanding.

If possible, work on problems (not just GWs) in groups! Group discussion is extremely beneficial to studying. If you're doing great in class, pair up with someone who may be struggling. It is beneficial to both!

Mechanisms and Reactions:

Flashcards help. If you don't want to carry flashcards, use your smartphone or tablet. Take pictures of the flashcards. They will be with you wherever you go. Note about flashcards – flashcards are only as good as the organic chemist that makes them. You still need to understand the core fundamentals of organic chemistry to do mechanisms and remember transformations. If you blindly memorize, you won't have any intuition to start drawing if presented with a 'twist' problem.

Make an outline grouping the reactions that occur by the same mechanism. Make another outline of mechanisms covered that were specific to a certain reaction, *ex.* ring opening of epoxides, keto-enol tautamerization, etc.

Make another outline of the reactions that you learned, where we went over the mechanism, but won't be tested on the mechanism.

Make yet another outline of the reactions you learned without any mechanism.

Study the outlines and understand the fundamental similarities that will allow you to explain/predict chemical reactivity for similar systems. When doing synthesis problems, the reactions you carry out *must* be known reactions covered in class. Use the appropriate reagents.

For the mechanisms covered in class, know (like the palm of your hand) the step-by-step process for the simplest case. Once you know the simplest mechanism, look at the more advanced problems given to you (TA worksheets, practice exams, and GWs). Do those mechanisms the way I explained "tackling problems."

Once a concept becomes too complicated for you to understand, seek help from a classmate, from the *Lecture Team,* or from tutors, and we will guide you through the concept.

Graded GWs, Quizzes and Exams:

Once you get your graded exams and GWs, understand the problems. The concepts covered will not go away. Learn from the mistakes BEFORE THE KEY IS POSTED.

FAST FACTS

How to Succeed in Organic Chemistry

By Jessie Merlin

It is true that many people don't succeed in organic chemistry, and that it requires you to use parts of your brain that may have lay dormant for years. Some people find this to be difficult—and it is! But once you start to really understand the material, organic chemistry may just be the most rewarding class you have ever taken.

It's the first day of organic chemistry, and your professor tells you to take a look at the two people you're seated next to, because by the end of the semester one of them will be gone. Your advisor tells you that organic chemistry is different from other science classes, and upperclassmen say its hardest class you'll ever take. What is all the hype about?

It is true that many people don't succeed in organic chemistry, and that it requires you to use parts of your brain that may have lay dormant for years. Some people find this to be difficult—and it is! But once you start to really understand the material, organic chemistry may just be the most rewarding class you have ever taken.

If you've ever found yourself asking your biology or chemistry professors why something happens, chances are you'll learn the answer in this course. Organic chemistry deals with molecular structure (what molecules are shaped like and how this influences their properties) and reaction mechanisms (the precise pathways by which chemical reactions proceed). These concepts are fundamental to understanding biology, chemistry, biochemistry and the molecular foundations of medicine. However, because this material is not usually broached in introductory courses, you must become well versed in the language of organic chemistry while learning the other information. For these reasons, its time to think back and remember the study skills you've used in other classes because—as important as they were before—they are even more important now.

—over—

Top 10 Organic Chemistry Study Skills

Following is a list of organic chemistry study skills that I used when I took organic chemistry, which I also taught to folks like yourself as a Supplemental Instruction leader. I hope you find them as helpful as I have. Good luck to you!

10. *Start studying organic chemistry from Day 1, and don't stop until you've taken the final.*

The pace of organic chemistry is faster than most classes, so if you fall behind even for a few days, it may feel like you're racing to catch up.

9. *Review lecture notes carefully, as if your life depends on it!*

You've heard this a million times. A million and one won't hurt. Because organic chemistry requires you to learn the language of nomenclature and mechanisms, and because each lecture depends entirely on the one before it, taking fifteen minutes each day to review your notes will improve your understanding of the material.

8. *Be an active learner—especially when you are writing mechanisms. Continually ask yourself, "What does this mean?"*

It's easy to copy the material that the professor puts on the board. But, make sure you understand every step of the mechanism and, if you don't, find out!

7. *Question others—your professor, your TA, your friends. Asking questions is key!*

Sometimes, people who teach organic chemistry have been doing so for a long time, and they forget what it's like to be in your shoes. They may not anticipate your questions, so you may have to take matters into your own hands. If something doesn't make sense, chances are it isn't because you missed something your teacher said, but because organic chemistry is complicated. Raise your hand!

6. *Work in study groups. Ochem parties are more exciting than you think.*

Organic chemistry is about problem solving, and sometimes it helps to talk things out with some friends. Add some soda and a pizza and you've got an ochem party!

5. *Do problems, problems and more problems.*

How do you get good at organic chemistry? Practice, practice, practice. Since many of the skills organic chemistry requires—talking in the nomenclature language, drawing complex structures and thinking through mechanisms—may be new to you, it is important to become very, very familiar with them.

4. *Go to extra review sessions whenever you can.*

Don't miss out on Supplemental Instruction, recitations, study sessions or any other opportunity for you to practice your newfound organic chemistry knowledge.

3. *Use your model kits! You didn't donate $14 to the Chemistry Department for nothing.*

It sometimes helps to see what your professor wrote on the blackboard in three dimensions. Or perhaps your professor uses a model kit routinely in class. Either way, models help you see what's actually going on.

2. *Notecards—give 'em a shot!*

So many reactions, so little time! Try writing the name of the reaction and the reagents on one side of the flashcard, and the reaction mechanism on the other side. It might even help to color code your cards—oxidation reactions in red, hydrogenation reactions in blue, etc. Carry them with you and, when you have a few spare minutes, flip through them to refresh your memory. Before quizzes and exams, look at the reagent side of the card, and see if you can write the complete mechanism on the other side.

1. *Relax—you're ready to succeed!*

Carnegie Mellon
ACADEMIC DEVELOPMENT
412/268-6878
Cyert Hall, Suite B5
www.cmu.edu/academic-development