

How to Study Chemistry

It is recommended that you spend about two hours outside of class for every hour spent in class. For General Chemistry you will spend 3 hours in lecture, 3 hours in lab and 1 hour in recitation every week, so you will need to work on chemistry for 14 hours per week outside of class. Spreading this out, perhaps studying 2 to 3 hours per day, every day, is more effective than cramming it all in at the last minute.

The following, adapted from Uno, G. E. "Handbook on Teaching Undergraduate Science Courses: A Survival Training Manual" (University of Oklahoma Printing Services: Norman, OK; 1997, p. 137-139), sets forth a good set of helpful hints for succeeding in chemistry.

1. Studying is More than Spending Time

- A. Commit to understanding, not memorizing, the material
 - i. Build a foundation for understanding first.
 - ii. Add details to complete the picture.
- B. Memorization can not help you understand
 - i. **Concepts** the ideas connecting the details.
 - ii. **New Situations** *applying* your knowledge to novel cases.
- C. Always ask yourself *questions* (especially How? and Why?)
 - i. Never be satisfied with just knowing the example given in lecture (use practice problems).
 - ii. Look at the underlying principles.
 - iii. Make connections with previous material.

2. What You can do to Improve Your Study Habits

- A. Be *responsible* for your own success
 - i. *Attend class.*
 - ii. *Pay attention* during lecture.
 - iii. If you don't understand, *ask questions.*
 - iv. Don't put things off until the last minute.
- B. Prepare for class *ahead of time*
 - i. Skim the lecture notes before class.
 - ii. Become familiar with figures, diagrams and terminology (e. g. read the text before it is covered in lecture).
- C. Taking Notes
 - i. Copies of the lecture slides are available on the course home page. Use these to prepare an outline for the next lecture.
 - ii. Leave room for additions from lecture and the text.
 - iii. Listen to the lecture first, then write! Do not attempt to write everything down, paraphrase.
 - iv. Develop shorthand for common words.
 - v. Annotate your notes to remind you to:
 - 1. Ask a question.
 - 2. Clarify a point.
 - 3. Refer to a diagram in the text.

- vi. Don't attempt to copy complex diagrams during lecture.
 - 1. Make a note to look it up in the text, or copy it later.
 - 2. Listen to what is said about the figure, and take simple notes.
- vii. Include drawings and examples to assist you to remember the main point of the lecture.

- D. After class (no later than the next day)
 - i. Review your notes; fill in any blank spaces. Spend time organizing your notes so they are easy to review and follow.
 - ii. Add necessary figures from the text.
 - iii. Carefully read text assignments and add information to your notes.
 - iv. Mark anything that you don't understand and get those questions answered immediately.
 - v. Link different sections of the notes to each other and make transitions between sections.
- E. Make use of the chapter highlights in the text.
- F. Attend office hours and visit the AXΣ tutors.

3. How to Prepare for and Take an Examination

- A. Take the exam seriously.
- B. Plan ahead. Begin preparing 3 - 4 days in advance of the exam. This provides time to have questions answered.
- C. Study with friends, but do it seriously.
 - i. Ask each other the hardest questions you can think of
 - ii. Come up with your own exam questions.
 - iii. Try to make connections among topics (the big picture).
 - iv. Try to draw pathways, relationships, etc.
 - v. Explain the major concepts in your own words.
- D. Exam taking strategies
 - i. Get a good night's rest. This is easier if you are prepared.
 - ii. Read the questions carefully.
 - 1. What is being asked?
 - 2. What do I know about the topic? Write this in the margin.
 - iii. Read all the answers for multiple choice questions.
 - 1. Systematically eliminate incorrect responses.
 - 2. Use logic to choose between remaining answers.

4. Some Methods for Effective Use of the Text

- A. Skim the chapter first
 - i. Be able to explain in simple English what the chapter is about.
 - ii. Get a general overview of the chapter. Don't get bogged down in facts.
- B. Learn the vocabulary. Here is one of the few places that memorization is essential. Use flashcards or whatever study aid helps you to know the terms.

- C. Look for statements you don't understand, ask about them in lecture, recitation or office hours.
- D. Consolidate your knowledge. If necessary, write a short summary of the chapter, in your own words, and compare it to the summary in the text.
- E. Pay careful attention to sample problems in the text. Work these problems as you encounter them. Do **not** attempt the practice problems before you have read the chapter and worked the examples!
- F. How to do the practice problems:
- i. Treat each practice problem as a test question. You must be able to work most problems in less than 5 minutes. Time yourself.
 - ii. Read the problem carefully and identify what the problem wants.
 - iii. Set up the problem as discussed in class and in recitation.
 - iv. Solve the problem. For numerical problems, watch your significant figures and units. A correct answer has both the proper units and the proper number of significant figures.
 - v. Ask yourself "Is the answer reasonable?" "Is the magnitude of the answer correct?" Check the units; if the units don't match what you expect, then there may be a problem. Watch for situations where a set of units defines another unit.
 - vi. If your answer does not match the book's answer:
 1. Check your math.
 2. Check your method, using the example problems in the text as a guide.
 3. Identify where any mistakes were made, and try to understand why it was a mistake. If you can't find your mistake, or don't understand why it is wrong, ask. **DO NOT SPEND MORE THAN 10 MINUTES LOOKING FOR YOUR MISTAKE!**
 4. If you understand where the mistake was, work another problem of the same type. Continue to work the same type of problem until you can get the correct answer in less than 5 minutes.
 - vii. If you got the correct answer, congratulations! Do another problem of the same type, and if you get this one correct you can assume that you can do this type of problem.