



Dr. Cathy Middlecamp
Department of Chemistry
University of Wisconsin-Madison
Written for the American Chemical Society Scholars Program
http://www.chem.wisc.edu/areas/clc/excel_in_chem.htm

Get an ATTITUDE!

Students are quick to point out that the *attitudes of their instructors* matter. One student put it this way:

- "I tend to work harder and achieve more in a class where the professors, the teaching assistants and the other students have a positive attitude and are enthusiastic about learning."

However, many students have noticed that *their own attitudes matter as well*. As one student put it:

- "Positive people produce positive results."

So get an attitude. Be eager to tackle a challenge or two. Be curious about what you might learn. Be ready for steady work, sustained over the entire course. Be kind to yourself and supportive of your classmates. In short,

- "Take in a positive attitude with you because if you believe in yourself and work hard, anything is possible ... even Chemistry."

With thanks to Jessica Kuehn, Lisa Abrams, and Steven Craig, who provided these quotes in their essays, "What makes a course student-friendly" written in the fall semester of 1996.

Look before you leap (into chemistry)

Are you ready to take chemistry? Timing can be everything. A semester's difference in taking a chemistry course can mean the difference between success and a failure.

When is the right time? Success in a chemistry course depends in large part in having a good match between your abilities, the demands of your course, and your personal commitments outside the course.

BEFORE you enroll in a course, check your match in terms of:

- **Personal time constraints**

Let's assume that your chemistry course requires about 20 hours a week for scheduled classes, homework, and studying. If you are working 15 hours a week and taking 12 credits in addition to your chemistry course, you simply may not have enough time to eat, sleep, and do the assigned work. You may need to creatively rearrange your schedule (or your life) before taking chemistry.

- **Your math background**

Let's assume your chemistry course assigns numerous numerical problems. If your math skills are weak, you may be unable to solve your chemistry problems and/or you may be plagued with "stupid math errors" that cost you time and exam points. You may need to delay enrolling in a course such as chemistry in order to get more math under your belt, first.

- **Your chemistry background**

Let's assume you took high school chemistry two years ago. If you have forgotten a lot or didn't learn the material well in the first place, you may be at a disadvantage in your college chemistry course. You may need to review past material before enrolling, as college chemistry courses are not simply a repeat of high school courses.

Thus, it makes sense to look before you leap. If you don't have what you need to succeed in chemistry, take the time to get it beforehand.

Study Buddies

Don't go it alone!

More and more, chemistry courses are emphasizing cooperative learning. Instructors are structuring their courses to promote teamwork and group decision making. Use the same strategies when you study.

Here's what students have said about studying together:

"Reach out to others and meet new people. You can not only make many friends, but you also now have a group of study buddies."

"Group activities also are helpful because two or more minds work better than one."

"I benefited a lot from group activities done during lab, lecture, and discussion. Even though you may be confident about your response, it helps a lot to get feedback and other ideas from your peers."

With thanks to chemistry students Jessica Kuehn, Sarah Mautz and Lisa Abrams who provided these suggestions in their essays, "What makes a course student-friendly" written in the fall semester of 1996.

10 Helpful Hints

To be successful in chemistry courses, you will need top notch learning skills. Not only will you use these skills in your course, but also you will employ them throughout your professional career. Your ability to zero in on what is important and to quickly master it will be a lifetime asset. Here are some tips:

1. Don't be too quick to dismiss your mistakes as "stupid". The pros keep track of their mistakes and learn from them.
2. Immerse yourself in the material, studying at least five days out of seven.
3. Study with a group of friends wherever possible. Pool your resources and talents.
4. Increase your ability to think in three dimensions, even when information is presented in two dimensions. Use this especially for molecular shapes.
5. Upgrade your computer skills. Check out electronic mail, the World Wide Web and library databases.
6. Topnotch writing skills aren't just for English majors. Keep working to improve yours.
7. Look for connections between topics, between courses, and between laboratory and classroom work.
8. Look for role models and possibly a mentor. Many have gone before you who can help and show you the tricks of the trade.
9. Make any special needs known, such as physical limitations or family obligations.
10. Ask for help, and do this earlier rather than later. Smart students ask for help.

SLEEP!

There's no mystery to it: if you don't get enough sleep, your chemistry will suffer on two accounts:

1. Your brain will not work as well.
2. You are more likely to get sick.

Research shows that people often don't get as much sleep as they need. This sleep deprivation, over time, leads to reduced brain power and work efficiency. More simply put, if you stay awake too long, you don't think straight and make stupid mistakes. When it comes to doing chemistry, you need all your brain cells working full power.

Furthermore, have you ever noticed that you are more likely to come down with a cold when you are behind on your sleep? For many people, this is the case. Illness and chemistry courses don't mix. Do whatever you can (such as SLEEP) to keep healthy and well.

SLEEP! Forget cramming all night. Forget staying up all night to finish a laboratory experiment. Rather, plan ahead. Organize your time so that your work gets done early. Repeat: Get enough SLEEP.

Memorization is NOT a dirty word

Do you mix up terms like sulfide and sulfite? Symbols like Mn and Mg? Is it hard for you to remember how many milligrams are in a gram? Can you keep straight the charges on a proton, neutron and electron?

If you have trouble with any of these, relax. **It is quite normal to forget.** However, given that forgetting is a natural part of learning, you need to build in some strategies to remember the information that you need to succeed in your chemistry course.

Students and faculty alike may speak ill of memorization, saying that they believe one should *understand*, not memorize chemistry. Understanding *is* important. However, so is memorization. Here's why:

• Efficiency

Once you memorize something, the information is instantly available to you. You don't have to waste time searching for it each time you need it. Think how hard it would be if you had to look up every phone number you dialed, without having some key ones memorized. Similarly, you don't want to be looking up the different numbers of carbon atoms in methane, ethane, propane and butane every time you use these.

• Freedom to think

Once you have memorized something, you are free to use your brain space for something else. Think how tangled your thoughts would be if you tried to compute something without knowing the basic math facts. You'd never be

free to sit back and think about what the problem is about. Similarly, you can't think about chemical equations and what they mean if all your brain space is taken up by trying to decipher the chemical symbols, subscripts and coefficients that they contain.

- **Smooth sailing**

Once you memorize something, you don't have to mentally fumble around trying to remember it. Think how much more smoothly a conversation goes when you know a person's name and aren't trying to remember it while you are talking to the person. Similarly, your ability to talk to your instructor and peers goes more smoothly if you don't fumble when you speak the language of chemistry.

One final thought. **The important thing in chemistry is to know when to memorize something and when NOT to.** For example, it is handy to have memorized the position of Na (sodium) on the periodic table so that each time you need to find it, you don't have to hunt all over the chart for it. However, it is not necessary to memorize either its atomic number (11) or its average atomic mass (22.9898). Be strategic in what you memorize and what you don't.

Enjoy yourself

Enjoy chemistry? That's right. At the very least, you can probably find *some* part of chemistry to enjoy.

- Consider the alternative: a course with no fun and nothing to brighten your day, ... or a course where you commit all that time and energy and you get little or nothing in return. A good strategy, therefore, is to find something that you like about chemistry (or else to switch to a different field or major).
- It may be a particular topic you will enjoy. It may be an "ah ha!" that will make you smile. It may be the chemical reaction demonstrated in lecture that caught you by surprise. It may be the friendships that you form working with others in the laboratory. It may be the sense of accomplishment you feel. If all else fails, it may even be the fact that you are one day closer to the end of the semester.
- The point is, there must be *something*. Find it! You are likely to do your best when there is something enjoyable involved.