

A Guide for Studying Chemistry

Chemistry is different than any other subject. It is objective, employs specific procedures, involves symbols and formulas, and it has a vocabulary all of its own. Consequently, the study skills you need to succeed in Chemistry are also unique. Although there is no one right way to study Chemistry, the following are a few of the most important things, tips and study skills you need to know in order to do well in Chemistry. The tips are excerpted from Chemistry.about.com and WikiHow.com.

Chemistry requires active learning.

Unlike some academic subjects, you can't excel or even become proficient at Chemistry by just listening and reading. Chemistry requires actively doing. Consequently, to learn Chemistry you must do all your homework and assignments. If you don't do your homework or complete your assignments you won't memorize the formulas or internalize the procedures required to become really proficient in Chemistry.

Some people think they're just not good at Chemistry. Experience indicates that most people can do Chemistry; however, *most people really need to work in order to become proficient at Chemistry.* While studying a couple hours for a history exam at the end of the term is usually sufficient, Chemistry requires routine studying and daily learning. Anyone who isn't willing to get actively involved in the process of learning Chemistry is going to struggle.

Chemistry is cumulative.

Chemistry is a very sequential subject. What you learn one day builds on what you learned previously and is required to support future learning. It's like building blocks. If you miss any of the building blocks you can't progress. This is why with Chemistry it's so easy for students to fall behind if they miss school or don't complete homework on time. While cramming can help you pass tests in other academic subjects, it will do very little to help you pass your Chemistry tests.

As you progress through school, you'll also find that one Chemistry chapter builds upon another. For example, without successfully comprehending how to write names and formulas, it may be very difficult to understand chemical reactions. You can't perform poorly on one chapter and expect to excel the next. You'll have to go back and re-learn previous Chemistry concepts and subjects you neglected to learn in previous chapters.

Focus on the principles.

In most secondary history classes being able to memorize names, dates and events is all you need to pass. *However, with Chemistry you'll find that rote memorization of formulas and equations won't cut it.* Yes, you do need to be able to memorize information, but that's just the beginning. More importantly you need to know how to use formulas, understand how equations work and apply those mathematical concepts to solve problems.

Chemistry involves so many formulas, equations and procedures that it can be difficult to remember everything. Don't try and memorize everything. *With Chemistry, understanding is more important than knowledge.* You will be given the math equations and constants that you need on the tests. The important thing is to understand how to use the given equations and constants to solve problems. All the knowledge in the world won't help you if you don't understand the basic Chemistry principles. Focus on developing a good understanding of all the major concepts initially.

Many procedures used for solving one Chemistry problem can be used to solve other Chemistry problems. As you progress in Chemistry, try and apply what you've learned previously to each new problem you encounter. *The ACE method of problem solving has shown to be a very effective strategy: Analyze, Calculate, Evaluate.*

Learn the vocabulary.

Chemistry has a vocabulary all of its own. Additionally, many commonly used words have different meaning when used in association with Chemistry. Take the time to create a Chemistry vocabulary log

where you note down and define each new Chemistry vocabulary term you encounter.

Many students quickly come to the conclusion that they just aren't cut out for Chemistry or that they just can't understand it. This is very rarely the case. Chemistry requires patience, discipline, and dedication. If you dedicate yourself, believe in yourself, and put in the effort you will make it through Chemistry – and you might even find that you really like it.

Chemistry grows in complexity and difficulty.

Chemistry becomes increasingly complex as the year progresses. Consequently, many students have to spend more time studying Chemistry than they do other subjects in order to succeed. It's not uncommon to spend at least an hour a night studying Chemistry once you get into reactions, stoichiometry, and thermodynamics. So if studying Chemistry is consuming all your time, you're not alone.

Note taking.

Students often write down what they see the teacher write down. *Unless otherwise instructed, you should focus your note taking around key concepts and formulas that are discussed during class.* Include in your note taking any explanatory remarks made by the teacher. These are often critical to fully understanding the Chemistry principle or concept being discussed.

Take copious notes on formulas or concepts the teacher emphasizes, as these are likely to show up on future quizzes and tests. And again, if the instructor says something you don't understand, raise your hand and ask for clarification. It is also recommended that you make a list within your notes of those concepts that you're struggling with so you can go back later and get additional help. Immediately after class, review your notes. Take a moment to make sure you understand everything you wrote down while the lecture is still fresh in your mind.

Homework is critical to learning.

Chemistry is one subject that usually requires homework. *Chemistry homework is not intended to make life miserable. It is simply necessary if you want to develop good reasoning and problem solving skills.*

Most people do not understand Chemistry instantly after they hear the teachers lecture. To learn Chemistry you must experience it. You must work out Chemistry problems and apply what you've learned. Homework provides students the opportunity to really learn how Chemistry works both in theory and in practice.

Homework is most effective when it's completed while the lecture is still fresh in your mind. While there's nothing wrong with waiting to complete your homework until a later date, you may find that completing Chemistry assignments while the concepts are still fresh in your mind is most effective.

One of the biggest problems students have when completing Chemistry homework is that they don't read the notes and/or text associated with the assignment or individual problems. Many students will quickly attempt to solve a Chemistry problem and then give up when they can't see how to do it. *Reading all the instructions and notes prior to each homework assignment is necessary to completely Chemistry homework problems.*

When it comes to Chemistry homework, the answer isn't always what the teacher is most interested in seeing. *Chemistry teachers are more interested in how you arrive at your answer than the answer itself.* When completing Chemistry homework, always show your work. Include all the steps you took to arrive at your answer in an organized, logical manner. Many Chemistry instructors will give partial credit as long as you show your work. You will not receive any credit for an answer if work is not included.

ACE problem solving. The following are tips for how to go about solving Chemistry problems.

Analyze:

- **Read the problem.** Read the problem carefully and make sure you understand what is being asked.
- **Re-read the problem.** Now read the problem again and write down what you are **given** and what you're being asked to **find**.
- **What is the problem asking for?** Write down in your own words exactly what it is the question is asking you solve or find.
- **Write down what you know.** Now go back through the problem and write out the information, facts and figures provided in an organized format.
- **Draw a diagram.** If applicable, develop a diagram that more fully represents the problem. Give yourself a path to finding the answer.
- **Put together a plan.** Identify any formulas that may help you solve the problem. Figure out what you're going to need to work the problem. Often there are intermediate steps that you'll need to complete before arriving at your final answer.
- **Find an example problem.** If you're having a difficult time getting your mind around the problem, try finding a similar problem that you do understand, or that has already been worked out. Work the simpler problem and then go back and work the harder, yet similar, problem.

Calculate:

- **Carry out your plan.** Once you have a good grasp on what's being asked and what needs to be accomplished, complete your plan. Make sure to show your work, step by step, so your instructor can see your reasoning and logic – and so that you can go back and check your work.

Evaluate:

- **Check your answer.** Does the answer you came up with make sense? Does the magnitude of the answer make sense? If you're able to plug your answer back into the original problem do so. This will let you know if your answer is correct. Did you include units? Did you show your work? Did you round to the correct number of significant figures?
- **Review the problem.** Once you've settled on an answer, go back and review the problem one last time paying attention to the concepts, formulas and principles that were required to come up with your solution. This will help you internalized what you've learned and prepare you to tackle more challenging Chemistry problems.

Get some help.

Ask for help if you need it. Use your teacher, other students or a tutor if necessary. Learning Chemistry is much easier if you take advantage of the knowledge and experience of others.

Do not wait until the last minute to get help. Chemistry is cumulative. So if you miss a concept, you're likely to get behind really quickly.

Don't be afraid to ask questions in class. If you don't understand a concept, chances are there are a lot of other students who don't understand the concept either. Don't worry about what other people will think or how you might look. If you don't understand something, raise your hand, ask a question and get clarification. If there isn't enough time during class to get the clarification you need, visit the teacher during office hours or after class.

Taking advantage of study groups is a very good idea for studying Chemistry. With a study group of 4 or more people chances are that at least one person will have a good understanding of a Chemistry concept and can explain it to the rest of the group. Having the opportunity to explain complex Chemistry concepts to others also helps to solidify your own understanding of the concept. All around, study groups can be very beneficial for studying Chemistry.