Graduate School in Chemistry and Biochemistry

A bachelor's degree in chemistry, whether it is a Bachelor of Arts or a Bachelor of Science, opens many doors. One can work in industrial and government laboratory settings, work as a high school science teacher, take a business position, or go on to law school for a career in patent or environmental law, to name a few. But in today's world, relatively few people who stop at a bachelor's degree are given final responsibility in their work environment. Laboratories are usually overseen by a supervisor with a masters or a doctoral degree, so most scientists who want to advance in their field will at some point consider going on for an advanced degree.

Preparing for Graduate School

Graduate school requirements are rigorous, but also somewhat flexible. In terms of coursework, Master's and doctoral programs in Chemistry generally require students to have at least one year each of general, organic and physical chemistry, and at least one semester of analytical chemistry, as well as some advanced electives suitable for a student's area of specialization. Most doctoral programs will not consider candidates unless they possess a B average or better in their undergraduate science coursework, and obviously, the higher, the better.

Students will also need to take the Graduate Record Examinations, both the general examination and the subject (Chemistry) exams. Generally, students will enter a graduate program in Fall semester of a given year, and should try to take the GRE examinations at least one year in advance to insure the results are available in time to include in their application. Most students are advised not to sit for the general and the subject examinations on the same day, as they can be very stressful. A schedule of dates for the GRE exams is available at www.gre.org.

Perhaps the most important thing one can do in preparing for graduate school is to gain research or work experience. Graduate programs value the recommendations of research mentors and supervisors very highly, and need to see that the applicant has some experience in applying the subject before admitting them for further study.

The Master's Degree

The Nature of a Master's Degree: A Master's Degree (either Master of Arts or Master of Sciences) indicates a stronger background in science than a bachelor's degree. A typical master's program runs 2-3 years, and consists mostly of coursework, though many include some research work to prepare an original research paper (a thesis). A master's degree gives a scientist a deeper understanding of their subject matter, allowing them to solve more complex problems. In the workplace, someone who holds a master's degree will likely be given more responsibility, as well as a higher salary than someone who holds a bachelor's degree.

Obtaining a Master's Degree: It is possible to pursue a master's degree on a part-time basis, so a student can continue working full-time and attend classes. Also, many employers will pay tuition for employees who go on, provided those employees agree to work a certain number of years for the company after receiving the degree.

The Doctoral Degree

The Nature of a Doctoral Degree: A doctoral degree in chemistry or biochemistry (Doctor of Philosophy, or PhD.) is a long-term commitment, can generally takes 5-6 years to complete. Students generally only take about 2 years of coursework, and most of their time is spent working on a research project (a thesis) under the supervision of a research mentor. A doctoral program is really an apprenticeship, in which the mentor teaches the student how to conduct research. This includes teaching students how to identify interesting problems, gain insight on them, and present the results to the outside world. At the end of the program, the student presents their thesis, and is prepared to conduct independent research in an academic, government or commercial setting. Many find research to be a very rewarding pursuit, but if it does not interest you, you almost certainly do not want to pursue a PhD.

Obtaining a Doctoral Degree: A doctoral program requires full-time commitment from students, and students are almost never permitted to retain outside jobs. However, almost every doctoral program not only waives tuition for its students, it pays them a stipend. While students do not get rich, it is enough to live on while they complete their degree.

Choosing a Doctoral Program: Earning a doctorate is both a long-time commitment, and one that dramatically shapes your future work. While there is no guarantee you will continue to work on the specific research topic you choose for your thesis, the choice of subject determines both the skills you acquire while pursuing your degree and the scientific community in which you participate. Both of these have a real influence on your future career, and your choice of subject matter for your thesis, and your choice of thesis advisor, are therefore very important.

If you have any research experience as an undergraduate, your best source of advice on finding a good program in the area that interests you is your research advisor. They have contacts in the field, and can tell you which schools are particularly strong in the areas that interest you.